

# Technical COMMUNICATION

*Journal of the Society for Technical Communication*



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The Society for Technical Communication is the largest association of technical communicators in the world. STC is currently classifying the Body of Knowledge for the field and communicating the value of technical communication. Its volunteer leadership continues to work with government bodies and standards organizations to increase awareness and accurate perception of technical communication. Membership is open to all with an interest in technical communication. Visit the STC website ([www.stc.org](http://www.stc.org)) for details on membership categories, fees, and benefits.

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## About the Journal

Technical Communication is a peer-reviewed, quarterly journal published by the Society for Technical Communication (STC). It is aimed at an audience of technical communication practitioners and academics. The journal's goal is to contribute to the body of knowledge of the field of technical communication from a multidisciplinary perspective, with special emphasis on the combination of academic rigor and practical relevance.

Technical Communication publishes articles in five categories:

- Applied research – reports of practically relevant (empirical or analytical) research
- Applied theory – original contributions to technical communication theory
- Case history – reports on solutions to technical communication problems
- Tutorial – instructions on processes or procedures that respond to new developments, insights, laws, standards, requirements, or technologies
- Bibliography – reviews of relevant research or bibliographic essays

The purpose of Technical Communication is to inform, not impress. Write in a clear, informal style, avoiding jargon and acronyms. Use the first person and active voice. Avoid language that might be considered sexist, and write with the journal's international audience in mind.

Our authority on spelling and usage is The American Heritage Dictionary, 4th edition; on punctuation, format, and citation style, the Publication Manual of the American Psychological Association, 6th edition.

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Miriam F. Williams, Editor

# An Interview with Dr. Roxane Gay

For this issue, I had the pleasure of interviewing Dr. Roxane Gay. Dr. Gay is a prolific author, editor, social commentator, and educator, whose critically acclaimed works include the *New York Times* best-selling collection of essays *Bad Feminist*, which *Time Magazine* calls, “a manual on how to be a human.” Dr. Gay holds a PhD in Rhetoric and Technical Communication from Michigan Technological University and, in this short interview, offered the *Technical Communication* readers ideas about the importance of technical communication; our role in implementing diversity, equity, and inclusion (DEI) initiatives; and her hopes for the future of our field.

**Miriam:** What attracted you to the field of technical communication? In what ways do you use technical communication in your work today?

**Roxane:** I came to technical communication in an unexpected way. When I started my graduate program, I didn’t know anything about the field. I originally intended to get a PhD in creative writing, but then an opportunity arose, and I changed course. As I immersed myself in rhetoric and technical communication, I loved the framework of it, which underlies so much of the communication we encounter in our lives from advertising to instruction manuals to op-eds to political speeches and everything in between. Rhetorical frameworks underpin almost everything I do. I am always thinking about the most effective way to communicate my opinions and ideas, about the different audiences who will be

engaging with my work and in what context. Lots of people use technical communication even if they don’t realize they are.

**Miriam:** I often hold conversations with colleagues in industry, government, and education who have never heard of technical communication. What should we do to introduce our field to a broader audience?

**Roxane:** To introduce our field to a broader audience, it is necessary to make connections between our field and the way people encounter it in their lives, the way they use it in their own communication. Even a simple email has elements of technical communication in it. When you strip away the jargon, there is a lot of common ground where people can connect with the work we do.

**Miriam:** In technical communication research and teaching, the field has taken “a social justice turn.” In what ways do you believe technical communicators can help social justice initiatives in the community, industry, and government?

**Roxane:** I would say the “social justice turn” is a necessary corrective. Bias informs everything and it’s important to actively remember that and work to counteract it. As technical communicators, we have a lot to offer social justice initiatives by helping entities think about the best ways to communicate their DEI ambitions and then actually implement them. So many (white) people decide that they are being excluded from certain discourses because they aren’t the explicit



focus. And they shouldn’t be! But how do we craft messaging that doesn’t give them fodder for their self-induced alienation? There’s a lot more but that is one of the key things we can do.

**Miriam:** Finally, what is your hope for the future of technical communication?

**Roxane:** My hope is for the field to become more inclusive from top to bottom—who we see as authorities, how we teach our craft, the language we use to communicate, all of it. And, of course, as always, I hope more people within academia, recognize the importance of what we do.

We thank Dr. Roxane Gay for sharing her thoughts on the future of technical communication and look forward to more of her incredible work.

## IN THIS ISSUE

In this issue, our authors also pose questions and make important recommendations for the future of technical communication.

In “Hashtag #TechComm: An Overview of Members, Networks, and Themes from 2016-2019,” Chris Lam asks, “Who are the most prominent voices in the #TechComm twitterverse, and what characteristics do they have in

common? What sub-networks exist within the #TechComm twitterverse? What are the major themes that arise in the technical communication twitterverse between 2016 and 2019?” Lam finds “Based on the network analysis visualizations, there appeared to be two major orbits within the #TechComm community . . . While there are some distinctions between the two major orbits within #TechComm, there are distinct opportunities for bridging the practitioner-academic divide.”

In “Intelligent Algorithms: Evaluating the Design of Chatbots and Search,” Nupoor Ranade and Alexandra Catá wrote, “Throughout our study, we sought to understand the usability design of chatbots and how chatbots compare to search. Based on the findings in the first test, conducted with just chatbots, we created a high-level design heuristic as an initial baseline into understanding how to consider chatbot usability, information design, and accessibility when designing a chatbot . . . We hope that future research will pursue some of these ideas and use our heuristic to evaluate chatbots from other sectors and for other purposes . . . This study also paves the way for pedagogical research to look at how technical communicators can extend their work to add value to this new genre of communication.”

In “Post-Fact Fact Sheets: Dissociative Framing as a Strategy to Work Past Climate Change Denial,” Beth J. Shirley asks, “When the data is out there, do we need to keep pumping it out in new and more engaging ways, or can there be a more methodical approach? How do we make the science any clearer? How do we work with communities and groups whose identities may be wrapped tightly around issues pitted against environmentalism (e.g., coal mining, timber extraction)? And what can we do to motivate individuals to act on climate change?” Shirley also asks, “How important is it to first make the science clear? In an era referred to colloquially as the ‘Post-Fact’ or ‘Post-Truth’ era, when misinformation is almost more readily available than truth . . . What is needed is a rhetorical strategy for climate change communication that does not rely on the knowledge deficit model. Dissociative framing offers such a strategy.”

In “The Mandative Subjunctive in Technical Writing, or the Gap between Subconscious and Conscious Grammatical Knowledge,” Edward A. Malone and Elizabeth M. Roberson write, “Although the mandative subjunctive has received considerable attention in the published literature of linguistics, our study is the first to examine it for an audience of professional

writers and editors as well as students and teachers of technical communication . . . Thus, the results of both our elicitation experiment and our analysis of workplace documents suggest that editors are likely to encounter both mandative variants in workplace writing for the foreseeable future, and the sentences in which they are used will need to be edited competently for semantic accuracy as well as stylistic clarity and consistency.”

Finally, in “Plagiarism and Copyright: An Analysis of Technical Communication Textbooks,” Michele Mosco asks, “How do the latest editions of widely used technical communication textbooks in the United States teach students about plagiarism, collaboration/authorship, copyright, and ethics?” and “How do the approaches used in textbooks align with workplace practices?” Mosco finds, “. . . in many instances, there is a significant disconnect between what students learn and how this learning applies in the workplace. Traditional views of authorship and academia’s emphasis on ‘not copying’ to avoid plagiarism run counter to industry practices in the workplace. Textbooks should prepare students to understand the important differences of copyright, plagiarism, and ownership as they pertain to both academia and the workplace.

# On the Cover



## ARTISTS' NOTES

A virtual workspace gives people the luxury to work from anywhere at any time remotely. Employees are often connected via a private network and are able to interact with either using various tools. My illustration depicts people being able to connect from the corners of the world. A remote and virtual workspace saves time and money and is convenient. It is often more productive as employees who have the freedom and flexibility to work on their own time usually produce greater results. A virtual environment means that location is no longer a restriction, which means a greater talent pool.

## ABOUT THE ARTIST

**Diya Singh** is an undergraduate senior at Kennesaw State University majoring in Interactive Design. With her concentration in UI/UX, she looks forward to being able to pursue a career in this area. Growing up with a big family, she has learned to work together, especially creatively, with her peers. When not in school, she takes on small art projects for local clients, families, and friends. She hopes her drive and passion comes through in her work. She is available at [singhdi0111@gmail.com](mailto:singhdi0111@gmail.com).

# Honorable Mention

## ARTISTS' NOTES

Our graphic design focuses on the representation of a standard academic life of college students in the pandemic. The two main features of the visual shown are the core interaction elements, students and the internet. COVID-19 has been lasting, and it has dramatically changed college students' professional lives in a variety of ways. For safety reasons, instead of sitting in a classroom normally, listening to and communicating with teachers face to face, students are taking notes in front of their laptops and watching avatars or live videos on remote communication platforms at home. These remote communication platforms, to a certain extent, provide more opportunities in improving students' professional productivity and facilitating their career development. Although online classes may distract attention for some students, recordings and asynchronous videos do give them more room to adapt to autonomous learning and develop self-control. Most of the experimental courses have been cancelled, but there are still a small number of professors willing to give students more intuitive and detailed laboratory observation in the form of a webcast. Meanwhile, there are more internship opportunities than usual because of the lower cost of commuting and less need for in-person activity. Overall, the pandemic has brought both opportunities and challenges to students in cultivating their professional lives.



## ABOUT THE ARTISTS

**Yangtian Yan** is an international student from China but currently studying at University of Delaware. He is a senior undergraduate student with a Psychology major and a double minor in Economics and Data Analytics. Yangtian is passionate about advocating remote communication and taking full advantage of the shifts caused by Covid-19. He is available at [samyyt@udel.edu](mailto:samyyt@udel.edu).

**Jiamian Wang** is an undergraduate student at the University of Delaware studying Computer Science. This Bachelor of Science degree encompasses programming, computational systems, and computers. Jiamian is passionate about spreading positive messages in his designs. He is available at [wjm@udel.edu](mailto:wjm@udel.edu).

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# Hashtag #TechComm: An Overview of Members, Networks, and Themes from 2016-2019

By Chris Lam

## ABSTRACT

**Purpose:** This study provides a four-year overview of the #TechComm community on Twitter, specifically identifying influential members, key networks, and thematic content of tweets. This data provides insight into trends, tools, organizations, and events prevalent in the #TechComm community.

**Method:** The study reports outcomes of four methods. First, statistical analyses were used to analyze 75,333 tweets from the most active 290 members of the #TechComm community. Second, profile data from community members' profiles were coded per mutually exclusive categories. Third, the TAGS Explorer, which uses Google's visualization API, was used to explore networks and sub-networks. Finally, a principal components analysis was conducted to examine topics and to identify significant themes in the tweets.

**Results:** Members of the #TechComm community are diverse, with a majority being practitioners. Most members self-identify as technical communicators or writers, but other job titles include content specialist, software documentation specialist, and manager. Considering members' relationships and interactions, data visualization highlighted two major networks: academics and practitioners. Among academics, most of the conversation was facilitated by a few users. In contrast, practitioners participated in smaller sub-networks. In the conversations, eight major themes arose from the principal components analysis; themes include Adobe, DITA/XML, academic #TechComm, and STC.

**Conclusion:** The study reveals potential areas where the divide between practitioners and academics could be bridged; these areas include curricular inclusion of DITA/XML and Twitter as a venue for research feedback from practitioners.

**Keywords:** Twitter, #TechComm, technical communication community, academic-practitioner divide

## Practitioner's Takeaway:

- Provides an overview of the online #TechComm community
- Outlines trends and topics of conversations relevant to practicing technical communicators
- Highlights prominent and influential voices in the Technical Communication community
- Reveals the prominence of DITA for modern technical communicators
- Connects content strategy to DITA, clarifying the role of technical communicators in content strategy work



## HASHTAG #TECHCOMM

### INTRODUCTION

Technical communication is a field that continually evolves because of its connection to technology—as technology evolves, so too does communication with and about technology. Because of the rapidly changing nature of technical communication, it can be difficult to track trends, best practices, and other field-related innovations. Additionally, what it means to be a “technical communicator,” including competencies, skillsets, and areas of expertise, continues to evolve as related fields and sub-disciplines emerge like content strategy and user experience (UX). Some of these shifts have been documented in academic scholarship, like in Brumberger and Lauer’s analysis of job advertisements in technical communication (Brumberger & Lauer, 2015). However, even with this important research, the challenge of documenting and understanding what is trending in technical communication remains difficult because of the varied experiences and perspectives within the field.

While the field of technical communication has been studied in a variety of contexts, little research using Twitter exists. Twitter is a microblogging social networking website that allows its users to share brief 280-character messages in real time. A defining feature of Twitter is the ability to tag tweets with hashtags, which serve as a tool to archive and organize tweets. Many communities have arisen from the use of shared hashtags on Twitter. For instance, widespread and hugely popular communities have emerged in recent years, such as #Blacktwitter (Graham & Smith, 2016) and the #ArabSpring protesters in Egypt in 2010 (Hermida & Lewis, 2014). Hashtags are not only a means to tag and organize tweets, however. Research has also argued that communities on Twitter form around deeper bonds, including shared experiences, shared language and vernacular, and shared values (Boyd, Golder, & Lotan, 2010; Stephansen & Couldry, 2014). While the hashtag #TechComm has been well adopted as a way to tag tweets related to #TechComm for at least ten years, no systematic research has answered the fundamental questions related to the hashtag #TechComm including 1) who are the prominent voices in the #TechComm community; 2) what networks exist in the #TechComm community?; and 3) what content themes are being tweeted about in the #Techcomm community? Answering these

foundational questions will provide additional insight into what it means to be a technical communicator in the 21<sup>st</sup> century.

Within the field of technical and professional communication, Twitter has been used as a research tool in a variety of ways. For instance, Twitter has been examined as a communication tool in crisis communication (Potts, 2013; Potts, Seitzinger, Jones, & Harrison, 2011). Additionally, Twitter has been studied for its potential to innovate pedagogically (Friess & Lam, 2018; Lam, Hannah, & Friess, 2016). Research has also examined how companies have used Twitter to manage technical help with end users (Lam & Hannah, 2017). While there has been academic research in technical communication involving the intersection of Twitter and technical communication, no study has used Twitter to answer questions about the field itself.

The current study examines the field of technical communication by analyzing the hashtag #TechComm over a four-year period (2016-2019). This data provides insight into the trends in the field of technical communication as well as the individuals who make up the #TechComm community.

### LITERATURE REVIEW

While no prior research exists examining the #TechComm community, researchers have attempted to answer questions about identity and trends within the field in a variety of ways, including studies of practitioners, analyses of job advertisements, and examinations of how programs and curriculum align with industry requirements.

#### The Changing Nature of Technical Communication Practice

Researchers have attempted to understand the work of technical communicators through workplace studies, interviews, and surveys of practitioners, which provide important first-hand accounts of experiences, practices, and perspectives. From these studies of practitioners, researchers have identified key trends and practices within the field. One such trend is the shifting of job roles, responsibilities, and skillsets of practicing technical communicators. For example, in a study of technical communicators at IBM, Fisher and Bennion (2005) argue that “technical communicators will need to shape organizational structures that move the profession



forward in new directions, with new technologies and new skills, while supporting the core value added by technical communication (Fisher & Bennion, 2005). The authors further argue that technical communicators must possess both technical domain knowledge and business acumen to succeed in modern workplaces. Related to technical domain knowledge, Albers (2005) argued that “the future of the field will be technology laden. Technology permeates everything a practicing technical communicator does. How we react to changes in that technology on both the individual and organizational level will have a dramatic impact on the development of the profession” (Albers, 2005, p. 271). Further, Hackos (2005) outlined the specific tools and technologies necessary for honing technical domain knowledge. These include “content management, topic-based structured authoring, translation management, improvements in product usability, minimalism, and a relentless focus on user needs” (Hackos, 2005, p. 275). Generally, the narrative around the future of technical communication in the early and mid-aughts included an emphasis on changing technologies and the knowledge economy, fundamentally shifting the practices of technical communicators. With these changing shifts, Redish (2003) argued that technical communicators must be flexible in their ways of developing necessary skills and competencies as well as articulating value (Redish, 2003).

While research examining trends in technical communication took specific shape and prominence in the early and mid-2000s, research continues to focus on the changing nature of technical communication. Some studies have argued that technical communication’s legitimacy and power are strongly tied to expanding what it means to be a technical communicator. Henning and Bemer (2016) argue for a revision of the Bureau of Labor Statistics’ definition of technical communicator to include explicit references to theory, media, and audience (Henning & Bemer, 2016). Similarly, Rice-Bailey (2016) suggests that technical communicators must be able to articulate their value to subject-matter experts in order to establish legitimacy (Rice-Bailey, 2016). However, the study revealed that many technical communicators were not able to articulate value outside of narrow definitions. The expanded definition of what it means to be a technical communicator was also tackled in a relatively recent analysis of over 1,000 job advertisements (Brumberger

& Lauer, 2015). One key finding in the study was the presence of over one-third of all job advertisements that focused on “newer categories of Content Developer/Manager and Social Media Writer. These jobs were much less (or not at all) visible prior to the wave of mobile and social media development that began in 2007 with the release of the iPhone.” (p. 238). Additionally, Brumberger and Lauer (2015) emphasized the importance of content (as opposed to static documents) in newer categories of jobs for technical communicators, which supports Hackos’ 2005 prediction that the future of technical communication will center around content management and topic-based authoring. Similarly, other small-scale studies have emphasized the importance of content and content management as key for modern technical communicators (Dubinsky, 2015; Kimball, 2015).

Much research has been dedicated to better understanding the changing nature of technical communication. Studies involving practitioners have revealed a consistent evolution of technical communication toward newer forms of content and content management, which necessarily requires competencies in both tools and technologies. However, these studies also point out that the traditional skillsets of technical communicators such as strategic and rhetorical prowess and user-centeredness continue to remain central to the modern-day technical communicator.

## The Changing Nature of Technical Communication Education

In response to the changing nature of technical communication practices in the workplace, researchers have also examined how technical communication curriculum has shifted. Rainey et al. (2005) examined curricular alignment by interviewing managers of technical communicators and noted a growing emphasis on the ability to collaborate, people skills, and technological competencies (Rainey, Turner, & Dayton, 2005). From a curricular perspective, the authors present a tension for educators to emphasize technology but not center curriculum only around tool training. This debate, whether to teach tools or to teach broader competencies, has been prominent in many discussions of curricular alignment with industry needs. Clark and Andersen (2005) argued for adopting a “technical college program model” wherein students are

## HASHTAG #TECHCOMM

required to take more sequential courses that include business and technology management training (Clark & Andersen, 2005). Echoing this suggestion for increased training in business and management, Whiteside (2003) pointed to holes in technical communication curriculum based on a perceived lack of business knowledge, technical knowledge, and experience with subject-matter experts among new technical communicators (Whiteside, 2003).

More recently, the theme of teaching technology in technical communication curriculum continues to be addressed. In a study of 65 undergraduate programs in the United States, Meloncon and Henschel (2013) found that “many courses with a technology focus do not necessarily address cutting-edge technologies. For example, only a handful of course descriptions specifically address XML, DITA, or single sourcing. Such findings raise additional questions about what *technology* and *technical* mean in the TPC curricula” (Meloncon & Henschel, 2013, p. 61). This observation is particularly relevant given the emphasis on content and content management, technology, and evolving competencies in other studies of the field. Building on the core competencies outlined in Meloncon and Henschel’s study (2013), Stanton (2017) compared job advertisements and perceptions of hiring managers with the core technical communication curriculum. The study revealed that even though programs are varied, core technical communication curriculum seems to meet the needs outlined by managers and job advertisements (Stanton, 2017).

Documenting and understanding the changing practices and trends of technical communication has been well researched within the field both by examining workplace practice and technical communication curriculum. In both studies of practice and curriculum, research reveals a steady shift to the broadening of the field along with an emphasis on evolving technologies related to content and content management. While these studies provide important perspectives and insights, they are limited to self-reports from practitioners or by the limited language found in job advertisements. Therefore, the current study of the #TechComm community will provide new and important insights for both practitioners and educators.

### RESEARCH QUESTIONS

**RQ1:** Who are the most prominent voices in the #TechComm twitterverse, and what characteristics do they have in common?

**RQ2:** What sub-networks exist within the #TechComm twitterverse?

**RQ3:** What are the major themes that arise in the technical communication twitterverse between 2016 and 2019?

### METHOD

#### Sample

The sample consisted of public tweets from individuals who self-selectively used the hashtag #TechComm. McKee and Porter’s (2008) adapted ethical framework for internet research was applied to determine if informed consent was necessary. In the framework, the authors utilize a grid with one axis representing public versus private information and another axis representing sensitive versus non-sensitive information. They also note ethically gray “fault lines” that cut across the grid that require case-by-case ethical decision-making. The present study falls clearly within the bounds of a study where individual consent is not considered necessary because it involves clearly public communication and non-sensitive information (McKee & Porter, 2008).

A tool called the TAGS explorer was used to collect the sample, which collected a total of 106,383 tweets over a four-year period from December 2015 to October 2019. The TAGS explorer is a web application that uses Twitter’s API to automatically collect tweets and store them in a Google spreadsheet (<https://tags.hawksey.info/>). Along with the content of the tweet, the TAGS explorer collects data, including the date of the tweet, author of the tweet, follower count, and friend count. While this study primarily focused on analyzing the content of the tweets, these additional data points were useful in providing context for the study. The method for setting up and maintaining the TAGS collector came from prior studies in technical and professional communication that utilized TAGS (Lam & Hannah, 2017; Lam et al., 2016).

To narrow the sample, tweets from active community members who consistently used the hashtag #TechComm were selected. An active community member was defined as someone who tweeted, on average, at least one time per month using the hashtag #TechComm. This average ensured that each member included in the analysis tweeted at least 48 times, which allows for a better reflection of the actual community as well as more accurate data analysis when extracting themes from the data. The average did not consider, however, the time frame in which the user tweeted. So, it is possible that a user could tweet a large volume one year and much less the next. In total, there were 294 users who met these criteria, which yielded 75,333 tweets, or 1,332,367 words.

## Procedure

On December 20, 2015, the first TAGS explorer spreadsheet was initialized and set up to automatically collect and store tweets in the spreadsheet. The spreadsheet scraped Twitter for tweets once every hour. The spreadsheet was checked every few months to make sure that it was still actively collecting the tweets. After each calendar year, a new TAGS explorer spreadsheet was initialized for the subsequent year until 2019. Each yearly spreadsheet was downloaded at the end of the year.

## Data Analysis

Data were analyzed using a variety of methods, including content analysis, network analysis, and principal components analysis.

### Content analysis

Content related to the authors of tweets was coded following Boettger and Palmer's (2010) method, which outlines how to develop a codebook for quantitative content analysis (Boettger & Palmer, 2010). To determine the type of members of the #TechComm community, each Twitter user was coded using five mutually exclusive codes:

- Academic: member's primary job is in higher education
- Academic Organization: account is associated with an academic not-for-profit organization
- Practitioner: the individual identifies as a practitioner in profile

- Practitioner Organization: account is associated with a not-for-profit organization that serves practitioners
- Company: account is associated with a for-profit organization

Additionally, content from Twitter profiles was used to determine user type. For users who were coded as *practitioners*, a sub-code was developed called *area of expertise* to determine the specific areas that were most represented in the sample. These sub-codes were determined based on self-reporting in the user's Twitter profile.

After the type of users was coded, an ANOVA was conducted to determine any statistical differences for number of followers between types of users. To make the comparison fair, the number of followers was recorded all on the same day (October 10, 2019)

### Network analysis

TAGS explorer was used for network visualizations, which utilizes Google's API visualization query language. TAGS explorer, as opposed to social network analysis algorithms, was used because the data gathered in this study was already cleaned and formatted for analysis using TAGS. TAGS does present some drawbacks, however. Since this TAGS visualization technique renders visualization within a web browser, data visualizations had to be limited to the most recent 18 months of data (from April 2018 – November 1, 2019) because including the entire sample required more processing power than the browser could handle. The TAGS explorer is a dynamic visualization, which means that the networks can be zoomed in and out and perspectives can be altered as the visualization is manipulated. Screenshots of the dynamic visualization were taken to view various perspectives of the network for analysis.

Additionally, the TAGS data visualization relies on a "degree rating" metric, which is calculated by adding the total number of replies, retweets, and mentions of an account within the network. Thus, a higher degree rating indicates centrality and connectedness within the network. Also, the degree rating does not include a user's entire follower base. Instead, it only includes those who are also within the network itself—that is, those who used hashtag #TechComm regularly from 2016-2019.

## HASHTAG #TECHCOMM

### Principal components analysis

To analyze the topical themes within the sample, a variety of statistical techniques and approaches were utilized. First, Meaning Extraction Helper (MEH) was used to determine the most frequently used words within the sample (<https://meh.ryanb.cc/>). MEH is a tool developed by Ryan Boyd that uses an approach that differs from a dictionary-based approach to linguistic analysis, which places words into categories of meaning. Tools like the Linguistic Inquiry and Word Count (LIWC) are an example of a dictionary-based approach. In contrast, meaning extraction identifies words that are common in a corpus across all texts in the corpus. It then calculates the percentage of texts that use the common keyword and sets a cutoff (usually 5%) so that no single text can outweigh any other. Then, MEH creates a binary matrix of keywords, which is used to conduct a principal component analysis (PCA). The PCA identifies groups of correlations, or word clusters, which can be interpreted into themes. For additional information on the method, Boyd provides a detailed explanation in a recently published article (R. L. Boyd, 2017).

After extracting themes within the dataset, AntConc, a free corpus analysis toolkit, was used to examine collocates within extracted themes (<https://www.laurenceanthony.net/software/antconc/>). Collocation analysis statistically measures the most common words either to the left or the right of any given keyword. This analysis provided additional context to the extracted themes.

## RESULTS

From December 2015 to October 2019, a total of 75,333 tweets were analyzed.

### RQ1: Who are the most prominent voices in the #TechComm twitterverse?

Most of the members in the #TechComm community are practitioners ( $n = 161$ ). The remainder of the members are split between companies ( $n = 48$ ), practitioner organizations ( $n = 42$ ), academics ( $n = 25$ ), and academic organizations ( $n = 5$ ). Among practitioners, a majority work in technical communication or technical writing ( $n = 67$ ). The next largest category was content specialist ( $n = 28$ ). A summary of all of the categories is shown in Table 1.

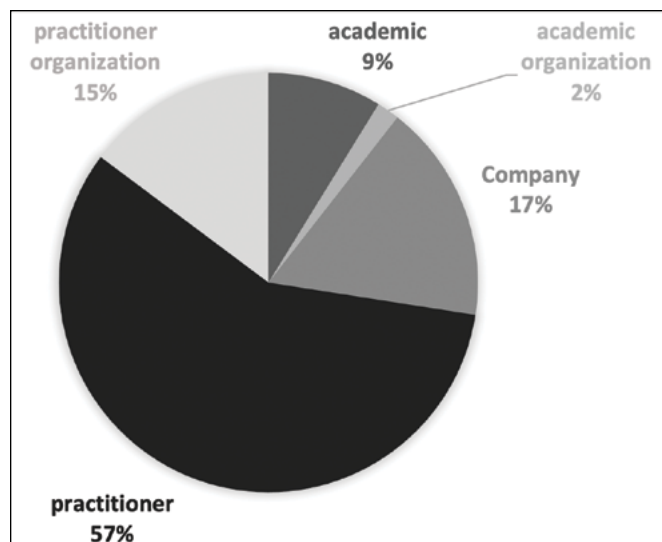


Figure 1. Types of members in the #TechComm community

Table 1. Practitioner's areas of expertise

Area of expertise	N
Technical Communication	67
Content Specialist	28
Software Documentation	9
Management	7
Developer	5
Marketing	6
Information	6
Training	4
UX	4

The results of an ANOVA comparing the number of Twitter followers by member type revealed no significant differences in reach among the various types of members ( $F = 1.442$ ,  $p = 0.221$ ). Across the entire sample, members of the #TechComm community averaged 1733.11 followers. More specifically, practitioner organizations had the highest average followers ( $M = 3562.5$ ) followed by academic organizations ( $M = 1535.5$ ), academics ( $M = 1481.2$ ), practitioners ( $M = 1429.7$ ), and companies ( $M = 1232.06$ ). The top practitioners and academics with the largest followings are also summarized in Tables 2 and 3.

**Table 2. Practitioners with the largest audience**

Username	Followers*
scottabel	20,600
Sara_Jo_Blevins	9630
WritingTechDocs	8848
rahelab	7272
technicalwriter	7237
ywsanchez	6475
tomjohnson	5483
Greencognito	4409
sarahokeefe	4011
tmaldous	3856

\*As of 10/11/2019

**Table 3. Academics with the largest audience**

Username	Followers*
guiseppegetto	3147
LizaPotts	2972
lecagle	2811
txescu	2732
Canaltch	2347
MikeRTrice	2214
emmarosephd	1979
Imeloncon	1510
professorsan	1467
JasonCKTham	1391

\*As of 10/11/2019

## RQ2: What sub-networks exist in the #TechComm community?

Figure 2 shows a visualization of the entire network from 2018–2019 for context. As can be seen in

Figure 2, there is a core community within the #TechComm twitterverse. Those users on the outside of these core are only loosely related or involved in the community based on their connection as measured by their mentions, replies, and tweets to other members of the community.

The visualization revealed two primary sub-networks (see Figure 3). The two orbits are centered around two users, which also happen to be the two users with the highest “degree” rating, @Imeloncon (degree rating = 134) and @Flacke (degree rating = 93). Zooming in on each of these networks, while there is some overlap, reveals there are also clear distinctions. For instance, Figure 4 shows that the first network includes mostly academics with little overlap into the networks of practitioners. On the outer orbit is primary academics and most conversations tend to be centered around @Imeloncon, which is the handle of Lisa Meloncon, an academic.

While most of the conversations are centered on @Imeloncon, some side networks and conversations do arise as facilitated through @SDoanUT (36 connections), @docforceO (23 connections), and @tomjohnson (23 connections). @SDoanUT seems to mostly reconnect into the academic orbit, while @docforceO and @tomjohnson both seem to act as a bridge between the two orbits. Tom Johnson is a technical writer and a prominent blogger in the technical communication community.

The second orbit seems to center around the user @Flacke, who, according to the Twitter profile, is in user documentation, topic-based authoring, DITA, and XML. Figure 5 shows a close-up view of this orbit. @flacke is very active on Twitter and mostly retweets other users’ tweets, which then communicates that tweet to her network of almost 1,000 followers.

While @flacke is certainly a main conversationalist in this orbit, there are other conversationalists that other smaller networks form around: @techcommgeekmom, @reb\_yoel, @adobe\_tcs, and @straygoat all are conversationalists within this orbit as well. These users (other than the Adobe handles) are all practitioners and post about a variety of technical communication-related content.



## HASHTAG #TECHCOMM

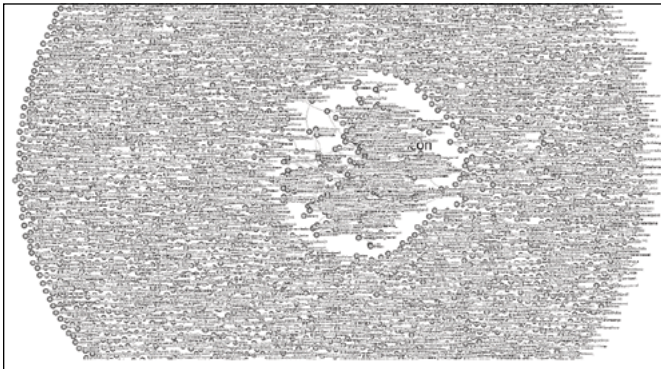


Figure 2. Zoomed out view of the #TechComm twitterverse (2018-2019) showing the "core" community

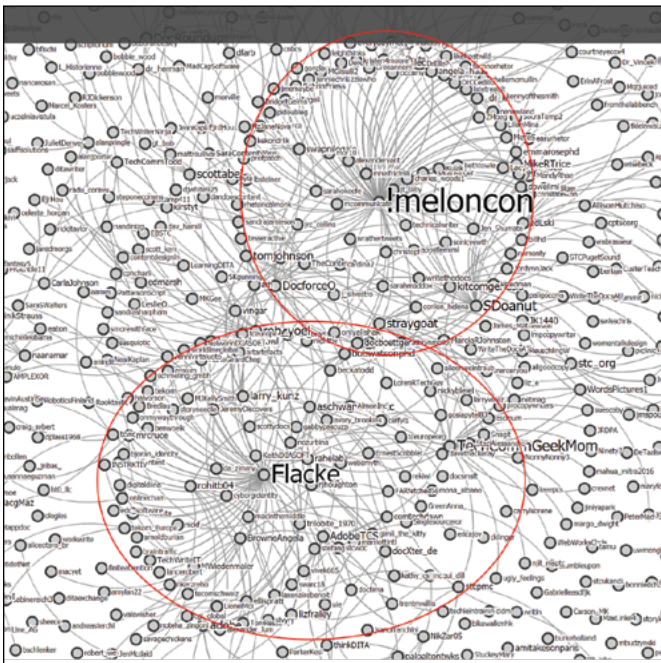


Figure 3. Two primary orbits in the #TechComm twitterverse (2018-2019)

### RQ3: What are the major themes that arise in the technical communication twitterverse between 2016 and 2019?

The Kaiser-Meyer-Olkin (KMO) yielded a value of 0.78, which indicates that the data was well-suited for a PCA

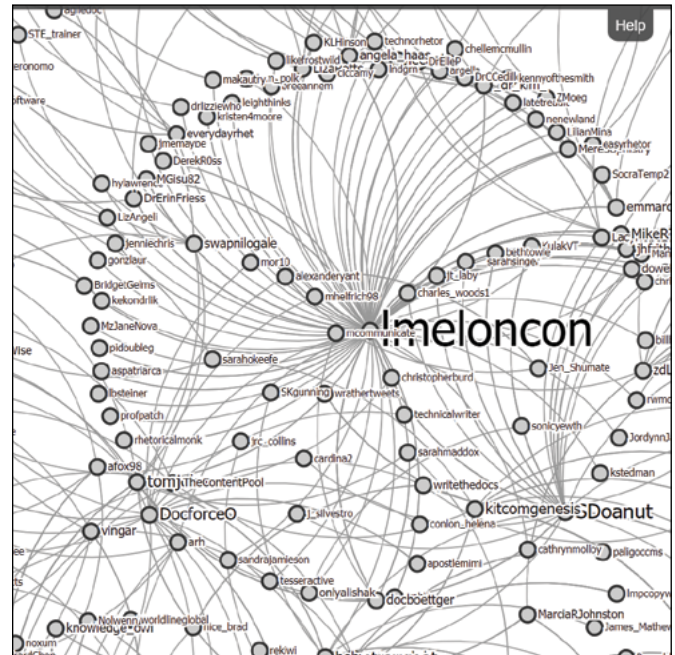


Figure 4. The first orbit of the #TechComm twitterverse (2018-2019) zoomed in

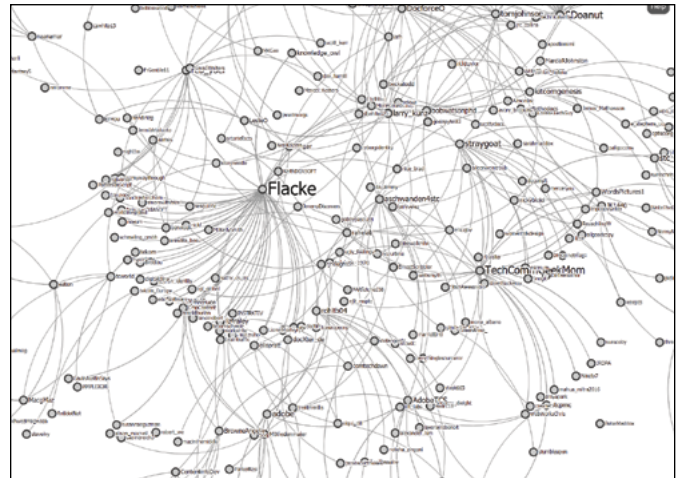


Figure 5. The second orbit in the #TechComm twitterverse (2018-2019) zoomed in

(Kaiser, 1974). The PCA results indicated that 15 factors extracted resulted in a cumulative 32% of the total variance in the model. Keywords were examined within each factor using AntConc to gain additional context about the word. Based on the 15 extracted factors, there were eight interpretable themes from the PCA.



### Theme 1: Adobe TC suite and other authoring tools

The first interpretable theme explained 16% of the total variance of the PCA. Using a cutoff loading value of 0.5, the first factor yielded 60 related keywords. Using AntConc to examine collocates of keywords, the theme centered around Adobe and its tools in the technical communication suite. A summary of significant words, usernames, and hashtags is presented in Table 4 below.

The term HTML5, which occurred 319 times across 44 different Twitter accounts, significantly collocated with the terms *Framemaker* ( $n = 46$ ,  $t = 6.65$ ,  $p < 0.01$ ) and with the term *Robohelp* ( $n = 36$ ,  $t = 5.93$ ,  $p < 0.01$ ). So, while HTML5 is a fairly general description of a web markup language, in the context of this corpus, it typically referred to an Adobe tool using that technology. Similarly, the term #contentstrategy, which was by far the most frequently used word in theme 1, significantly co-occurred with the term adobetcs over 1400 times ( $n = 1401$ ,  $t = 4.89$ ,  $p < 0.01$ ). Adobetcs is the official Twitter handle for the Adobe Technical Communication Suite.

### Theme 2: STC and the STC Summit

The second interpretable theme explained 10% of the total variance of the PCA. Table 5 summarizes some of the keywords that loaded significantly onto factor 2.

Based on an analysis of usernames, hashtags, and words that loaded heavily onto factor 2, the theme of this particular factor is the annual convention of the STC, also referred to as the STC Summit.

The usernames @dr\_herman ( $n = 164$ ) and @viqui\_dill ( $n = 192$ ) are both closely associated with the STC and the STC summit. They both occurred often in the corpus and were mentioned by 38 and 44 different Twitter accounts, respectively.

### Theme 3: Academic #TechComm

Theme 3 constituted 8% of the total variance of the PCA. Theme 3's loadings were very high, and the theme was easy to interpret. Table 6 summarizes the results for significant loadings of usernames, hashtags, and words. While theme 3 generally centers around the academic community, there seems to be a focus on rhetoric as three of the top four hashtags allude to rhetoric.

### Theme 4: Professional development and self-improvement

Theme 4 constituted 7% of the total variance of the PCA. Based on the factor loadings, words tended to cluster around the theme of professional development and self-improvement. That is, this theme focused on

**Table 4: Keywords for Theme 1- Adobe TC Suite and other authoring tools**

Keyword	Type of Word	Factor Loading	N (Total Frequency)	Dispersion (% of users who mentioned the term)
@abhi_adobetcs	Twitter Username	0.66	50	5.5%
@rohitb04	Twitter Username	0.63	65	5.9%
#contentstrategy	Hashtag	0.59	6647	73.4%
#html5	Hashtag	0.58	319	15.17%
#acrolinx	Hashtag	0.54	119	8.3%
#robohelp	Hashtag	0.54	1461	18.6%
accountability	Word	0.53	31	5.5%
flexibility	Word	0.53	39	6.6%
evangelist	Word	0.53	116	7.2%
xslt	Word	0.53	72	6.9%
suite	Word	0.52	227	18.3%

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**Table 5: Keywords for Theme 2 - STC and the STC Summit**

Keyword	Type of Word	Factor Loading	N (Total Frequency)	Dispersion (% of users who mentioned the term)
@dr_herman	Twitter Username	0.72	164	13.1%
@viqui_dill	Twitter Username	0.67	192	15.17%
#stcwdc	Hashtag	0.63	847	21%
#summit	Hashtag	0.62	1876	46.9%
#stc17	Hashtag	0.59	678	28.6%
Volunteer	Word	0.66	344	17.2%
Membership	Word	0.61	302	17.9%
Election	Word	0.6	341	19.7%
President	Word	0.59	188	13.8%

**Table 6: Keywords for Theme 3 – Academic #TechComm**

Keyword	Type of Word	Factor Loading	N (total frequency)	Dispersion (% of users who mentioned the term)
@attworg	Twitter Username	0.76	58	5.5%
@lmeloncon	Twitter Username	0.61	327	16.2%
#rhetcomp	Hashtag	0.81	70	6.55%
#womenintc	Hashtag	0.74	790	10.69%
#medrhet	Hashtag	0.73	552	6.55%
#teamrhetoric	Hashtag	0.71	111	10.69%
Faculty	Word	0.67	235	11%
Grad	Word	0.62	96	12.1%
Scholarship	Word	0.61	107	12.4%
Scholar	Word	0.57	28	9.65%
Teacher	Word	0.56	24	5.5%
Undergrad	Word	0.56	13	3.1%
Assignment	Word	0.55	42	6.9%
Academic	Word	0.50	241	20.6%

tweets about how to improve skills or use tools related to technical communication. Table 7 below summarizes the results for theme 4.

As can be seen in Table 7, much of this theme is dominated by the username and hashtag associated with “clickhelp.” ClickHelp is a company that sells a software documentation tool. As part of their website, they regularly post blog posts about a variety of topics related to technical communication. Many of these articles are about how to improve certain skills and competencies as a technical communicator. Additionally, the terms *personality* and *soft* often occurred in the context of tips for improving soft skills and examining the personality of technical writers.

### Theme 5: DITA and Lightweight DITA

Theme 5 clusters around the topic of DITA more. Theme 5 accounted for 7% of the total PCA variance. Table 8 (p.16) summarizes some of the most significant factor loadings. A company called Ixiasoft, which is a company that sells an enterprise-class DITA content management system, had a strong presence in this theme. Additionally, the usernames @ditawriter and @nkerzreho are both associated with the company as well. In addition to these, @scriptorium is the account for a content strategy consultancy that provides DITA-related deliverables as well.

Hashtags for Theme 5 are also clearly centered around DITA as well, including the #lwdita hashtag

that stands for lightweight DITA. I conducted a collocate analysis of the top two hashtags (#ditaxml and #lwdita) to determine what other words were significantly associated with these hashtags. For #ditaxml, words like contentstrategy ( $n = 156$ ,  $t = 5.26$ ,  $p < 0.01$ ), learn ( $n = 38$ ,  $t = 38$ ,  $p < 0.01$ ), and register ( $n = 49$ ,  $t = 5.16$ ,  $p < 0.01$ ) all significantly co-occurred with #ditaxml. Interestingly, for the hashtag #lwdita, words like techie ( $n = 6$ ,  $t = 14.9$ ,  $p < 0.01$ ), carlos ( $n = 6$ ,  $t = 12.8$ ,  $p < 0.01$ ), evia ( $n = 6$ ,  $t = 13.1$ ,  $p < 0.01$ ), and academic ( $n = 6$ ,  $t = 9.59$ ,  $p < 0.01$ ) all significantly co-occurred with #lwdita. These occurrences indicate that the topic of lightweight DITA is one that has some academic crossover, particularly by Carlos Evia, a professor at Virginia Tech University who has published extensively on DITA (Evia, 2016). Finally, it seems as though DITA has international relevance with both U.S. and international conferences devoted to discussing varying aspects of DITA.

### Theme 6: Job opportunities in technical communication

Theme 6, which accounted for 7% of the total variance of the PCA, centered around jobs in #TechComm. In this theme, no usernames or hashtags loaded significantly onto the factor. However, the words that did load were all clearly job related, as can be seen in Table 9. Based on the data, it appears many job postings are located in New York and Texas. Additionally, the term “analyst” appears often across the sample.

**Table 7: Keywords for Theme 4 - Professional development and self improvement**

Keyword	Type of Word	Factor Loading	N (total frequency)	Dispersion (% of users who mentioned the term)
@clickhelpnews	Twitter Username	0.67	711	7.6%
#selfimprovement	Hashtag	0.74	192	5.2%
#clickhelp	Hashtag	0.71	1109	6.9%
#skill	Hashtag	0.70	85	15.5%
#productivity	Hashtag	0.63	287	19.3%
Digest	Word	0.61	618	5.5%
personality	Word	0.58	17	5.2%
soft	Word	0.56	30	7.6%

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**Table 8: Keywords for Theme 5 - DITA and lightweight DITA**

Keyword	Type of Word	Factor Loading	N (total frequency)	Dispersion (% of users who mentioned the term)
@ixiasoft	Twitter Username	0.61	1501	30%
@ditawriter	Twitter Username	0.61	158	12.8%
@thinkdita	Twitter Username	0.56	218	11.7%
@nkerzreho	Twitter Username	0.55	80	6.9%
@oasisopen	Twitter Username	0.52	29	5.2%
@scriptorium	Twitter Username	0.52	709	28.6%
@tcworld	Twitter Username	0.5	637	29.7%
#ditaxml	Hashtag	0.58	192	5.2%
#Lwdita	Hashtag	0.56	53	9%
#cmsconference	Hashtag	0.53	1109	6.9%
#ditaueurope	Hashtag	0.51	85	15.5%

**Table 9: Keywords for Theme 6 - Job opportunities in technical communication**

Keyword	Type of Word	Factor Loading	N (total frequency)	Dispersion (% of users who mentioned the term)
junior	Word	0.59	28	4.13%
Financial	Word	0.59	74	5.8%
NY	Word	0.58	528	12%
Oracle	Word	0.58	44	6.9%
Corporation	Word	0.57	136	5.5%
Coordinator	Word	0.55	75	5.9%
Scientist	Word	0.55	25	2.4%
Compliance	Word	0.54	27	7.9%
Analyst	Word	0.53	294	6.6%
Martin	Word	0.52	37	7.6%
TX	Word	0.52	280	13.1%

### Theme 7: Software documentation and Write the Docs

The final interpretable theme was around software documentation, and specifically the organization. Write the Docs, which focuses on software documentation. Table 10 summarizes the results. The main usernames

that load onto this theme significantly are all practitioners, and @ericholscher is a co-founder of the Write the Docs organization. Additionally, @chrisinch significantly co-occurs with the term writethedocs ( $n = 17$ ,  $t = 7.63$ ,  $p < 0.01$ ). The hashtag

#wtd refers to the Write the Docs organization. Finally, Sphinx is a technical documentation tool used for software documentation. Sydney occurred about the Write the Docs Australia conference.

## DISCUSSION

The findings from this analysis of the #TechComm community provide a variety of insights that will be helpful for both practitioners and academics. In the following section, I discuss three important takeaways in more detail.

### Sub-communities in the #TechComm Serve Different Audiences and Purposes

While not totally surprising, a major finding of this analysis of the #TechComm community revealed a few key sub-communities. Based on the network analysis visualizations, there appeared to be two major orbits within the #TechComm community: academics and practitioners. There also seemed to be only limited overlap between the two communities. This confirms prior research that has pointed to a divide between practitioners and academics. For instance, a 2016 article examining the content of formal content forums for technical communicators (academic journals and magazines) suggested that there was very little content overlap between forums for academics and practitioners (Boettger & Friess, 2016). While that study examined formal publication venues, it seems that content

discussed on Twitter also has little overlap. This is not surprising given the varying interests and motivating factors for both practitioners and academics. It also seems further exacerbated by the fact that the academic community centered around a few key users who often focused on content only relevant to academics like #MentorMonday, which tends to focus on mentoring within the context and demands of academic life. It is also important to note that the findings of the study are indeed limited to users who used the hashtag #techcomm, so there certainly could have been more interaction and overlap between audiences without the hashtag.

The themes from research question three provide some helpful insight into some of the important conversations and topics within the #TechComm community. Within the practitioner orbit, there seemed to be a focus on documentation and the tools and technologies related to software documentation. Based on the network visualizations, one of the main conversationalists was @flacke, who identified as a documentation specialist. Further, the themes that arose in research question three further reveal that the community had focused conversations on the tools (Adobe TC Suite in theme 1), technologies (DITA and XML in theme 5), and conferences (STC and Write the Docs in Theme 2 and Theme 7, respectively) that help technical communicators in their work. Overall, it seems that practitioners have a vibrant community and consistently use the hashtag #TechComm to share important aspects of their work.

**Table 10: Keywords for Theme 7 - Software documentation and Write the Docs**

Keyword	Type of Word	Factor Loading	N (total frequency)	Dispersion (% of users who mentioned the term)
@chrischinch	Username	0.62	61	7.9%
@swapnilogale	Username	0.59	139	11.7%
@ericholscher	Username	0.58	38	7.9%
#wtd	Hashtag	0.66	130	12.8%
sphinx	Word	0.57	23	5.9%
documentarian	Word	0.55	12	2.1%
sydney	Word	0.54	85	6.6%

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### #TechComm Provides an Opportunity for Bridging the Practitioner-Academic Divide

While there are some distinctions between the two major orbits within #TechComm, there are distinct opportunities for bridging the practitioner-academic divide. There are, at least, two ways in which academics might leverage the findings of this study. First, for those involved in ensuring curriculum is meeting the needs of industry, this study bears some weight on the question of whether programs should be teaching tools, and if so, which tools to teach. Based on the variety of tools mentioned in the tweets, there does not appear to be an “industry standard” authoring tool. For instance, Adobe TC Suite, ArborText, Sphinx, IXIASOFT, and Oasis all loaded significantly on a variety of themes. What is foundational across the tools, however, are the technologies they are built upon, including XML and DITA. That is, programs might consider a course teaching these foundational technologies and exploring how knowledge of the technology impacts the successful use of a variety of tools. Furthermore, as students learn foundational technologies, they must then also learn about foundational concepts of topic-based authoring, single sourcing, and content reuse. Although the study is six years old, Meloncon and Henschel’s comprehensive survey of undergraduate programs specifically noted a lack of XML and DITA instruction across undergraduate programs (Meloncon & Henschel, 2013). While some programs may already implement such courses, it seems that undergraduate programs would be missing out on a major component of technical communication without at least one course dedicated to authoring using XML and/or DITA.

Aside from considering curricular changes, academics can use the results of this study to better understand practitioners’ needs and potentially meet needs while forming new research questions. Tom Johnson, a technical communicator, has been exploring divides between practitioners and academics for over a decade. Based on the network visualizations in Figure 3, Tom was also one of the few members of #TechComm that straddled between the two major orbits. His tweet in 2018 is a great summary of the divide:

“If the words ‘rhetoric’ and ‘rhetorical’ were off-limits to #techcomm academics, the word count in their articles would drop at least 20%.” (Johnson, 2018)

While his observation was humorous, he makes a good point and one that extends beyond just academic

articles that he references in the tweet. In fact, results of the study revealed that the academic theme included three hashtags with rhetoric in them. Further, the word “rhetoric” appeared 111 times in the sample and was tweeted almost exclusively by academics. While there is nothing wrong with theoretically grounding research using rhetorical frameworks, academics might take this perspective into mind when engaging in #TechComm.

As part of Tom’s effort to bridge the practitioner/academic divide, he conducted a survey in 2018 and found that a large percentage of academics admitted they do not understand the issues practitioners face in the workplace. One way to begin remedying this (along with joining the tc-academic-practitioner-bridge email list and reading Tom’s blog) is by simply engaging in #TechComm outside of the academic orbit. Based on the results of this study, we know that practitioners already share workplace experiences and issues on Twitter. But, beyond that, practitioners are willing and able to directly answer questions. By directly mentioning specific users from the practitioner community, perhaps academics can use #TechComm as a sounding board for a research idea to gain feedback about how to approach a research study as they might at a more formal conference presentation where the audience is primarily academics.

### Additional Takeaways for Practitioners of Technical Communication

The findings of this study revealed a vibrant community of technical communicators on Twitter using the hashtag #TechComm with most community members being practitioners. One key finding was the prominence of the hashtag #ditaxml. One practical takeaway for practitioners from this finding is that DITA and XML remain prominent in the #TechComm community. While this may not seem like a revelation, there has been much debate over the staying power of DITA (and perhaps even more so, the staying power of XML), with some who believe that DITA may no longer be relevant for technical communicators (Gillepsie, 2019; Johnson, 2015). Interestingly, another prominent hashtag was the hashtag #lwdita, which stands for lightweight DITA. Developed by Evia (2016), lightweight DITA is an architecture that does not rely on any particular technology or language, including XML. Therefore, regardless of where you fall on the DITA debate, the prominence of DITA, XML, and lightweight DITA



in this study points to an underlying trend of the importance of structured and topic-based authoring. While this manifested as DITA and XML in this study, it would be interesting to see if the technology shifts to something new in a future study. Regardless, participating in the #TechComm community will help provide practitioners with these answers in the future.

Results from this study can also be used as evidence for practitioners seeking professional development opportunities in their respective workplaces. For instance, much of the content related to DITA included announcements for “bootcamps” and other workshops dedicated to teaching the architecture. The presence of these workshops indicates that there is a need for additional professional development to learn DITA. Therefore, for practitioners who have yet to learn DITA, results from this study can be used to support requests for funding from decision decision-makers. For those practitioners who already are using DITA, results from the study could be used as evidence for upgrading or updating organizational workflows to include a content management system that integrates DITA or some other topic-based approach.

The study also revealed which sub-disciplines or sub-fields were most prevalent in sharing the hashtag #TechComm—namely #contentstrategy. While it is no surprise that technical communication and content strategy are related, the study revealed some context around the relationship between content strategy and technical communication. That is, one finding indicated that content strategy significantly occurred alongside the hashtag #ditaxml. The association of #ditaxml and #contentstrategy is significant because content strategy has become a catch-all term and can mean many different things to different people. For some, content strategy involves strategically considering content themes, messages, topics, and purpose. For others, the emphasis is on content metadata frameworks and content reuse (Halvorson, 2008). Based on the results of this study, it seems that for technical communicators content strategy is much more closely aligned to content reuse and metadata frameworks. While this certainly has implications for educators in how they should be approaching and teaching content strategy, it also has implications for practitioners looking to pivot their work into the world of content strategy as well.

Finally, in addition to trends surrounding DITA and related technologies, the study revealed the

prevalence of events and organizations. Common themes arose around organizations (STC, Write the Docs) and events (STC Summit, Write the Docs). Joining these societies and attending these events can be quite expensive, however. For example, it can cost up to U.S. \$1,800 to attend the STC Summit. So, for technical communicators who are not formal members of societies or regular attendees at annual events, this study is a good starting point for examining the relative value of joining an organization. Additionally, the results of this study could be used as evidence when asking for funding to attend these events or memberships to relevant societies.

## LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

With any empirical study, there are limitations. First, this study provided only a high-level overview of the hashtag #TechComm. It provided a snapshot of the major topics discussed in the community and an overview of who comprises the community. It did not, however, examine the content of individual tweets within the community. A future study could sample the #TechComm tweets and conduct a content analysis to further explore the topics with a greater level of specificity. Additionally, there are two limitations related to the Twitter data sample itself. First, research has pointed to the propensity for Twitter’s API to have biases for collecting data, which could lead to an incomplete dataset (González-Bailón, Wang, Rivero, Borge-Holthoefer, & Moreno, 2014). While the study (González-Bailón, Wang, Rivero, Borge-Holthoefer, & Moreno, 2014) involved much larger datasets than the one in this study, the potential for both missed users and underrepresented connections is still a valid limitation to point out. Also related to the dataset, another limitation of the study is the self-selecting nature of the sample used in the analysis. That is, the hashtag #TechComm only comprises those who voluntarily are on Twitter and then subsequently use the hashtag #TechComm. There are certainly many technical communicators who are not represented in this sample, so the conclusions cannot be generalized across the entire field. Future studies could utilize a different sampling method and research method, survey or interview for example, to further test the validity of these findings.

This study provided a descriptive overview of the #TechComm community from 2016-2019 by

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describing the members of the community, the sub-networks that exist in the community, and the major topics of conversation within the community. While limited in scope, it has created an important historical record of what has happened in the field. The hashtag #TechComm continues to be widely used, and this study provides a basis for comparison in future studies of this robust and everchanging community.

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# Intelligent Algorithms: Evaluating the Design of Chatbots and Search

By Nupoor Ranade and Alexandra Catá

## ABSTRACT

**Purpose:** To evaluate the usability of chatbot design and how chatbots and search compare for information delivery and usability, we ran two test cases. In the first, we focused only on chatbot usability, information delivery, and design. In the second, we compared chatbot responses to those provided by search engines to identify areas of similarities and differences in terms of accuracy, functionality, and usability.

**Method:** Test Case 1 uses an exploratory method to analyze chatbot functionality. Test Case 2 uses content analysis of search responses and corresponding chatbot responses. Data from two major telecommunication companies' websites—Sprint and Verizon—was used for both.

**Results:** In Test Case 1, we found that chatbots are generally more flexible and helpful when they provide information directly in the chat pane and allow free-form text entry, in addition to several other related characteristics. This was critical to receiving the information we needed efficiently and accurately. Results of Test Case 2 show that chatbots provide less information than search results, have longer wait times, and rely less on algorithms to get responses and more on constant updating.

**Conclusion:** Based on Test Case 1, we developed a heuristic that addresses usability, information design, and accessibility. In Test Case 2, we determined that search functionality is better than that of chatbots in terms of 1) speed of response, 2) accuracy of responses, 3) multiple formats for content delivery, and 4) ease of use and accessibility.

**Keywords:** chatbots, search, heuristic, information design, usability

## Practitioner's Takeaway:

- Content can be reused and integrated into chatbot information design.
- By comparing user behavior for using search in comparison to chatbots, technical communicators can make informed choices about which tools to use for product documentation websites.
- Chatbots feel more helpful when there is flexible user input, the chatbot is transparent about being a non-human entity, the chatbot is aware of its limitations, information is accurately given either in the chat pane or through a link, and the chatbot is responsive during conversation.
- Heuristics provided here can be used to design, develop, and test chatbots at a conceptual level.

*"I believe that at the end of the century the use of words and general educated opinion will have altered so much that one will be able to speak of machines thinking without expecting to be contradicted."*

— Alan Turing (1947)

## INTRODUCTION

Chatbots, also known as conversational agents, are on the rise and one of the most popular forms of artificial intelligence (AI). A chatbot is "a computer program designed to simulate conversation with human users, especially over the Internet" (Oxford Dictionaries, n.d.). Although chatbot technologies for developing interfaces have existed since the 1960s, the addition of intelligence through machine learning (Radziwill & Benton, 2017) and easy-to-use tools such as ChatFuel and Botsify have made chatbots easier to implement and train. They can now be easily integrated into existing information systems and social networking sites, such as Facebook, and developer productivity tools, such as Slack and GitHub. This has resulted in an exponential increase in the use of chatbots for online interactions since 2005.

Chatbots are participating in more than one-third of all online interactions known to take place between 2005 and 2015 (Radziwill & Benton, 2017). Chatbots help corporations by "reducing the time-to-response, providing enhanced customer service, increasing the rate of satisfaction, and increasing engagement" for customers (Radziwill & Benton, 2017). They carry out most of these activities by solving users' problems, either by giving users more information or navigating them to the place where they can find more information. It is in these areas that technical communicators play important roles.

Hughes (2002) argues that technical communicators restructure technical information in a user-centered manner and relate it to specific applications. They also create new knowledge that is presented in actionable terms, and the knowledge they generate helps to mitigate costs for corporations by reducing investments on support and development (Redish, 1995). Because chatbots are intended to serve as support tools, it is important to compare how information provided by chatbots differs from

other content published in technical communication work, especially product documentation websites. Search engines also play a key role in disseminating information. Technical communicators are often tasked with converting information in a form that is easily traceable by search engines (Killoran, 2010). Although there is some research on designing content suitable for search (Killoran, 2009; Killoran, 2010; Killoran 2013; Laursen, Moustén, Jensen & Kampf, 2014), similar literature on chatbots is almost nonexistent. Addressing this gap is important as it will help technical communicators understand how to design and format content for chatbots or other conversational agents such as Siri and Alexa, which are also popular. Considering the similarities to other tools for which technical communicators have designed content before, how can we decide which tool is more valuable for organizations? To do this, we must measure the effectiveness of each of these information tools. This research examines chatbots through two studies.

Test Case 1 examines support chatbots and their responsiveness to a set of inquiries where we evaluate the usability, information design, and content delivery of the chatbot. Test Case 2 compares chatbots with the website's search function to understand which is better. Differences between these tools help to highlight the characteristics of chatbots and search. These findings—advantages of one tool over another—when incorporated into the design and development of information tools, can make the tools more effective and impactful.

Chatbot design depends on a number of factors. Although rhetorical factors like purpose, audience, and context play an important role, the effectiveness of chatbots can be said to be on par with the product documentation site only if they provide equal access to information or make information finding easier. Further, by expanding the comparison from the search feature and including two chatbots in the study, we were able to derive characteristics that could be used for evaluating chatbots, making them more effective means of communication.

In this study, we conducted exploratory testing with two telecommunications chatbots to understand the basic design principles necessary to create an effective support chatbot. We included AT&T's chatbot in our



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initial investigation but removed it from the study because it required users to log in.

The results reported in this article enhance our understanding of chatbots and also help technical communication practitioners and researchers to:

- better understand whether chatbots can enhance the way we deliver content to audiences;
- use a design heuristic to develop, test, and research chatbots that provide troubleshooting and technical support;
- collaborate with other fields where such research is being conducted; and
- better understand perspectives, assumptions, and industry expectations about the value that chatbots bring and how to incorporate it into technical communication, information design, and publication management classrooms.

In the following sections, we first map out the key components in designing a chatbot and search feature for an information website. Then, we provide detailed comparisons between chatbots and search, specifically based on the design requirements, user experience, and content delivery models. Further, we discuss criteria that can be used to evaluate the quality of chatbots. Finally, the article highlights the impact of chatbot technologies on technical communication and ways to study chatbots for a better understanding of their value as well as for making cases for their adoption.

### BACKGROUND ON INFORMATION TOOLS

Some of the techniques to provide appropriately structured content for both chatbots and search involve writing and designing web pages in ways that are both broadly strategic and also meticulously tactical to ensure that they are read optimally by humans as well as search engines and chatbot algorithms. Such a combination of writing, reading, web page design, and analyzing audience needs marks these as precisely the kind of communication techniques that deserve to be the object of technical communication research.

Although chatbots and search are not new, advances in technology have made them effective solutions for providing customer support. Tools like chatbots and search were developed to address this need for customer support services and generate responses to customers' queries without human involvement (Paul, Latif, Adnan & Rahman, 2018). While search is designed to

crawl through the entire data and retrieve results for specific keywords, chatbots are developed to "handle natural language conversation with the user and serve them with the desired service" (Paul et al, 2018). The algorithms for both these tools are designed based on the complexity involved in simulating human information-seeking behavior (Tredinnick, 2017). Instead of attempting to simulate general human intelligence, algorithm developers and designers of chatbots have moved to a data-based approach. These algorithms use data from previous users' queries to produce better responses.

### Impact of Algorithms on Technical Communication Work

Algorithms are programs designed to be functionally automatic, and they act when triggered without any regular human intervention (Gillespie, 2014). For example, the Google search algorithm crawls the public web to index, pull, and display all of the relevant data when a user makes a request. The data consumed by algorithms can be structured or unstructured. Structured data is composed of clearly defined data types whose pattern makes them easy to search and categorize, whereas unstructured data does not have clearly defined types and patterns that cannot be easily searched, such as audio, video, and social media postings (Taylor, 2018).

While search algorithms function on existing data, chatbot (especially machine learning based) algorithms work on mining unstructured data drawn from the real world and often natural language sources (Tredinnick, 2017). Technical communicators are tasked with structuring unstructured data that can be consumed by these algorithms to produce accurate responses to users' questions. To do so, they need to consider different dimensions of data to make it easy for algorithms to process it—"how data was defined, collected, transformed, vetted, and edited (either automatically or by human hands)" (Diakopoulos, 2016). While these processes are not fully automated in technical communication work, they influence and impact algorithms and their success in either processing natural language or working from a particular dataset. In short, while strategizing content delivery or creating information frameworks, technical communicators prepare data so that it is easily findable by users (for

example, through website navigation) as well as algorithms (for example, search engines).

Understanding search algorithms are important for technical communicators because search is the predominant method for information delivery. Search algorithms used to be based on simply tallying how often the actual search terms appear in the indexed web pages, but search algorithms now enlist natural language processing (NLP) techniques to better “understand” both the query and the resources that the algorithm might return in response (Gillespie, 2014). Additionally, search engines like Google regularly engage in usability testing, especially “*A/B*” testing, presenting different rankings to different subsets of users to gain on-the-fly data on speed and customer satisfaction, which is then incorporated in a subsequent upgrade (Gillespie, 2014). Functionally, search provides additional advantages. Among the communication methods that would attract people to technical communication business websites, Killoran’s study found that search engines are significantly more helpful than most other methods. Such a connection between success with search engines and success attracting clients has made search algorithms pertinent for businesses in order to reach an audience of prospective clients on the web (2009).

Chatbots have also started gaining popularity on information platforms, for example, technical support websites, help pages, and so on. Traditional chatbot architectures depend heavily on large data sets that help process user queries using patterns and NLP. With little to no prior NLP backbone, chatbots can be expensive to develop (Paul, Latif, Adnan & Rahman, 2018). Another machine learning method to train chatbots is reinforcement learning. However, reinforcement learning algorithms are unable to structure data into datasets through patterns, thus increasing the constant need for human supervision and costing resources.

Thus, we can say that data is an important commodity for technical communication work. The nature of technical communicators’ roles has transformed significantly over time. They are tasked with finding ways to gather more data, make sense of it, and store and organize it to produce useful information, including the ability to transfer content in one format to be captured and manipulated into another (Dubinsky, 2015; Hart-Davidson, 2009) and to write content chunks that fit into a finished

information product. Most technical communication work finds its way through some kind of data generated either by the organization internally or on the publicly available websites (Killoran, 2010; Johnson-Eilola & Selber 2013; Barnett & Boyla, 2016). Technical documentation is produced through the act of coordinating several data and texts, including past versions of the documentation set, a series of drafts and revisions, inputs from stakeholders (especially product developers), emails, messages resulting from project management activities, and several other sources (Johnson-Eilola, 1996). Technical communicators sometimes use tools like content management systems (CMSs) to store and structure the data and textual content. Although CMSs are not part of the content delivery process, Anderson (2007) states that they aid the process of publishing content. Technical communicators make several rhetorical negotiations while gathering data from stakeholders and cleaning it to fit into CMSs. This content is then delivered to users through help websites, chatbots, or other information tools. We can therefore say that to make the content suitable for algorithms like chatbots, information construction and delivery format along with genre selection are important responsibilities that technical communicators can handle.

### **The Role of Genre and Algorithms in Information Design**

Genre is an important consideration in chatbot design. Technical communicators already engage with various types of documentation, such as product help systems, videos, and online forums, all of which can be viewed as genres. They fit the definition of genre as “typified communicative actions characterized by similar substance and form and taken in response to recurrent situations” (Miller, 1984). The social action that recurs in the publications genres of software documentation (Miller, 1984; Swarts, 2015) are impacted by the ways in which a user interacts with documentation types to solve problems and accomplish tasks. Awareness of document genre characteristics, especially purpose, form, and content, can be beneficial to both the technical communicator and the intended audience. While technical communicators can adhere to the genre conventions to design information architecture and content structure, users make use of standard structures

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to identify and work through genres to find required information (Earle, Rosso & Alexander, 2015).

In a series of studies, Freund (2015) concluded that the usefulness of specific document genres varied according to the task that the user was performing. Freund (2015) found that the perceived usefulness of specific document genres for specific task types was negatively related to a user's level of expertise. Instead, the user's familiarity with the subject matter of a particular project, task, or search impacted user's information consumption behavior. Accordingly, Earle, Rosso & Alexander's (2015) research found that the selection of genres used varied by user experience level, software product type, amount of product usage, and user role. This speaks to the challenge that technical communicators face to produce documentation to meet the needs of users in diverse contexts and also affirms the need for a healthy mix of content in specialized genres (2015), like chatbots. Technical communicators' work includes creating content that can be reused by multiple genres through various strategies (Hart-Davidson, 2013). This work can be extended to include delivery of information in various formats, including search and chatbots.

Website search is frequently used as an interactive information tool, often supported by CMSs. In Widemuth and Freund's (2012) review of past studies on exploratory search methods, they identified several characteristics of search: exploratory search tasks focus on learning and investigative search goals; searches are general (rather than specific), open-ended, and often target multiple items/documents; search involves uncertainty and is motivated by ill-defined or ill-structured problems; search is dynamic and evolves over time; search is multi-faceted and may be procedurally complex; and search is often accompanied by other information or cognitive behaviors, such as sense-making.

Technical writers use this knowledge to structure information so that exploratory search produces accurate results. One way of doing so is by using search engine optimization (SEO). This can be done in multiple ways, including keywords, appropriately configuring CMSs, chunking large portions of content, and so on. Search algorithms are designed to collect content from the CMS and to deliver information to users in a timely manner. Documentation frameworks like DITA (Darwin Information Typing Architecture)

also help improve SEO. By using DITA, technical communicators provide short descriptions of topics, making them identifiable.

Chatbots are another method that has become extremely popular in content delivery platforms. Trade publications in the technical communication field have speculated about the role of technical communicators for developing or supporting the development activities for chatbots for quite some time. In the 2018 January issue of *Intercom*, Earley states that chatbots are content delivery platforms that leverage data and AI. The conventional role of writers to create content and publish it in a structured and rationalized manner has become crucial for chatbot design as well. Earley (2018) predicted that as subject experts, technical communicators are most equipped to address the content requirements of chatbots. We believe that in addition to the content responsibilities, technical communicators can do a lot more, like designing the chatbot, reviewing the data and developing questions, improving the usability of the chatbot, and building the chatbot. Despite these reasons and chatbots becoming commonplace on information and marketing platforms, very little research has been published in technical communication scholarship; most discussion is found in trade publications. As technical communicators prepare for the role of supporting AI processes through content handling and interdisciplinary collaborations, we need to develop a better understanding of audiences' needs from chatbots and how we can use our existing knowledge to design content for evolving genres like chatbots. This research is an attempt to start that discussion.

## METHODS

The purpose of this study was two-fold. The first step was to evaluate the functionality, communication, design, and effectiveness of chatbots. The second step was to analyze the efficiency of chatbots when compared to the search feature on help websites. To do so, we used an exploratory testing approach in which we examined how chatbots responded to a series of inquiries. Then, we systematically analyzed the characteristics of chatbots to gain insights on their effectiveness based on the characteristics derived through a comparative analysis with search.

We started to examine chatbot content and search content on websites of three telecommunications companies—Verizon, Sprint, and AT&T. We chose telecommunication companies because we wanted to make sure that we had an adequate sample of data. Because these companies offered similar services to customers and most of their information is publicly available online, we found that there was sufficient and comparable resemblance in the information they provided. This was important in our communication design-based study and allowed us to ask the chatbots the same questions and compare similarities, saliences, and differences in responses. Additionally, very little research exists on evaluating chatbots (Radziwill & Benton, 2017; Yu, Xu, Black & Rudnicky, 2016; Peras, 2018), and almost none of it addresses chatbot requirements from a communication design perspective. Therefore, instead of analyzing a broad range of parameters, it was important to conduct an in-depth analysis to first establish the parameters themselves.

Since chatbots' appearances on web pages are similar to chat interfaces and the language used is semi-formal in nature, it becomes difficult to detect whether the conversation is happening with a human or chatbot. After an initial round of data analysis, we discovered that depending on where we accessed the chat, we either encountered a human agent or a chatbot. We generally found that accessing chat on the home and support pages consistently allowed us to interact with a chatbot, so we shifted focus to just the chatbot.

At this point, however, AT&T became untestable because the chatbot always required us to log in. Therefore, we removed AT&T from the study. This left us testing chatbot and search functions on only

two websites—Verizon and Sprint. Another challenge that we faced is that the data, chatbot, and search algorithms were updated on a regular basis. To conduct our research, we only used publicly available data and data collection occurred from January 2019 to May 2019. Based on the information on Verizon's website, 12 inquiries were designed that fall under three content categories: procedural, troubleshooting, or features (see Table 1).

Procedural inquiries focused on step-by-step instructions on how to accomplish a specific task. For example, "How do I activate a new line?" Troubleshooting inquiries differ from procedures in focusing on a device-related problem for which the customer desires a solution: that is, no real-time text, a hacked phone, a cracked screen, or outdated software. For example, "I think my phone has been hacked. What do I do?" Finally, feature-based inquiries focused on products or phone-related features. For example, "Are there wireless options overseas?" Inquiries also ranged in complexity. Since the same queries were run across both chatbots and the sample data was collected and analyzed by both researchers, the level of complexity was not determined or documented explicitly.

Data generated through conversations with the chatbots were documented in a spreadsheet and consisted of both the inquiries and the responses to those inquiries, which were generated from both chatbots and search functions. Conversations with chatbots were preserved in two ways. Sprint's chatbot had a transcript email feature, so we were able to collect data from conversation transcripts received over email. Since Verizon did not provide the email transcript feature, textual data from chatbot conversations were

**Table 1. Full list of inquiries used for Test Case 1**

Procedural	Troubleshooting	Feature-based
How do I activate a new line?	I want to activate real-time-text (RTT), but I don't know how.	Are there wireless options overseas?
How do I recycle my device?	I think my phone has been hacked. What do I do?	I want to purchase the latest Apple phone.
How do I find a specific charge on my bill?	I need to fix a cracked screen.	How do I purchase a Google Home?
How do I change my plan?	I want to update my device to the latest software.	I am looking for a new fitness tracker.

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copied and pasted into the same spreadsheet. When attempting to highlight specific features within the data set like choices, prompts, or workflow paths, we took screenshots for visual representations that were saved as JPEG files. The JPEG files and spreadsheet were saved in a shared online repository. Throughout the research, we put short memos (notes) into the spreadsheet to maintain a record of preliminary findings, knowledge sharing, and collaboration.

### Test Case 1: Evaluating Chatbots' Design

In our first test with just chatbots, we accessed the chat popup from the technical support page. Then, we copied and pasted the inquiry into the chat pane. To gather as much data as possible, we conversed with the chatbot naturally to draw out the conversation for as long as possible. The conversations ended when the chatbot requested that we to log in or if the chatbot transferred us to a human agent.

Test Case 1 used all 12 inquiries with Verizon and Sprint's chatbots, and we tracked how information was provided to the researchers. Using all 12 inquiries was important to ensure we had enough data for analysis.

We documented all chatbot responses in the shared spreadsheet as either being "Link Providing" or "Chatbot Providing." Link Providing responses meant the chatbot was unable to provide information in the conversation and instead provided a link to take us to the information we needed. Chatbot Providing responses meant the chatbot was able to respond in the chat pane with the information we needed. We also recorded additional notes for interesting and unexpected observations. The chatbots were very responsive, so the time it took for the chatbot to respond was not recorded as part of this test.

### Test Case 2: Comparing Chatbots to Website Search

We then conducted a comparative analysis between chatbots and search to investigate how these information tools perform differently and how they can impact users' information-finding experiences on telecommunication companies' websites. For this test, we used 5 of the 12 total inquiries in Table 1 (see Table 2). Unlike chatbots, a website's internal search tool can display results even if the user is familiar with only a few keywords and can articulate the problem with few words. Therefore, instead of using fully formed questions, we used only keywords or key phrases for both search and chatbots.

We put our inquiries into the chatbot space or chat pane after the chatbot asked for them. For example, we used the Sprint chatbot on the Sales web page. The Sprint chatbot began with the message, "Hi, I'm a Sprint sales specialist. Would you like any help today?" which shows a greeting followed by a question. We typed our keyword inquiry into the message space after that first message from the chatbot. The keywords we used are in Table 2.

We reported results on the shared spreadsheet. The results were as follows:

- Chatbot results were documented based on four main aspects: the time required or how long it took to get comprehensive information on solving the issue, messages relayed while the researcher (user) was waiting, whether the information provided by the chatbot was accurate, and whether the information was acquired through the chatbot only without human intervention.
- Search results were documented based on the number of search keywords used: time required

**Table 2. Inquiries and corresponding keywords used for Test Case 2**

Natural Language Inquiry	Type of inquiry	Keyword/Keywords used
How do I activate a new line?	Procedural	New line
How do I recycle my device?	Procedural	Recycle my device
I want to activate real-time-text (RTT), but I don't know how.	Troubleshooting	Activate real-time-text (RTT), but I don't know how
I need to fix a cracked screen.	Troubleshooting	Fix cracked screen
I want to update my device to the latest software.	Troubleshooting	Update device to the latest software



to acquire the desired and accurate information, efficiency of search reported as the position of an accurate result link in the series of links produced by the search query, and the delivery format of help information topic (e.g., video, FAQ).

## RESULTS

In our study, we first did some preliminary testing to get a feel for what we might expect as well as to address any potential issues. Then we conducted our full testing. In this section, we first describe our preliminary findings, which informed our full testing. Then we discuss the findings for both of our studies—Test Case 1 and Test Case 2. The next section describes the heuristic that was developed from these results.

### Preliminary Findings

Before the official testing, we performed preliminary testing with three inquiries, one from each category, to make sure they yielded valuable data to proceed with this research. The results of the preliminary testing were interesting. We generally found that depending on where users select the chat button on the website, they will encounter either a human agent or a chatbot. Human agents were commonly found when chat was accessed from product pages or sales-related pages, whereas chatbots were accessed from support and troubleshooting pages. Because the study is focused on chatbots, we used the chatbots on the home and support pages, and we avoided conversations with anyone identified as an “agent.” This shift removed AT&T from the study because AT&T’s chatbot seemed to always redirect us to the agents. The second reason we dropped AT&T from the study is that their support chatbot always required the user to log in using an AT&T account no matter the inquiry. Since we were using only publicly available information for our study, we could not proceed with using data provided by AT&T’s chatbot. It is also worth noting that there was a gap of a few weeks between preliminary testing and full testing. During that time, we determined that

the chatbot software was updated based on differences in design and responses. All inquiries tested during preliminary testing were retested during official testing.

### Findings 1: Chatbot Usability and Information Design

The findings from Test Case 1 led us to consider aspects of usability and information design when creating support chatbots. As technical communicators, we know that users access information online with intention, looking for specific pieces of information (Krug, 2014), and that mindset was taken into consideration when engaging with the chatbot and analyzing the data.

#### Chatbot inquiry input

We always started from the support page for both websites (Sprint and Verizon). We used the 12 inquiries (see Table 1) to simulate a natural conversation with the chatbot for as long as possible before the chatbot required us to log in or wanted to transfer us to a human agent. The input method for each chatbot was different and made a significant difference in our interactions with the chatbot. Verizon provided links to suggested topics as well as an option to enter text into a free-form text box. Sprint, on the other hand, was inconsistent in the initial interaction with the chatbot. Sometimes, the chatbot asked us for our personal information and allowed us to enter text into a free-form text box. Other times, we had to first choose from a list of categories (see Figure 1) for our inquiry before we could enter our inquiry. Categories helped users pick a topic that their search query belonged to. For example, “View your bill” and “Make payment” were both related to the user’s bill payment; both took users directly to the web page where these actions were to be performed instead of a help page that provided information to users on how to do it. For both chatbots, we started with the inquiry as written in Table 1, but as the conversation progressed, we also changed our phrasing and keywords to try to elicit the response we needed.

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**Figure 1.** Verizon provided links to suggested topics as well as an option to enter text into a free-form text box

**Figure 3.** The Sprint chatbot required us to enter our personal information before giving access to the free-form text box

**Figure 2.** In the Sprint chatbot, we had to first choose a category before being presented with the text-box to enter our inquiry

### Chatbot response and delivery

**Structure of response.** After submitting the initial inquiry, we had a natural conversation with each chatbot to help articulate our inquiry in a way that matched the chatbots' interpretation of the inquiry. This happened when the chatbot either rephrased our inquiry asking to confirm that the question was accurate or when it provided several suggestions for information (including hyperlinks to content topics). Some inquiries were Chatbot Providing, which meant the chatbot was able to give us the answer directly in the chatpane. This usually included descriptive text explaining the answer to the inquiry. For example, the Verizon chatbot instructed us on how to upgrade a phone to the latest software. Most responses were Link Providing, where the chatbot provided an external link to a particular topic or page with the information we were looking for. Verizon's chatbot generally responded

with Link Providing responses, and when we clicked on the external link, the chat pane stayed open to ensure we did not lose the conversation despite moving to a different webpage.

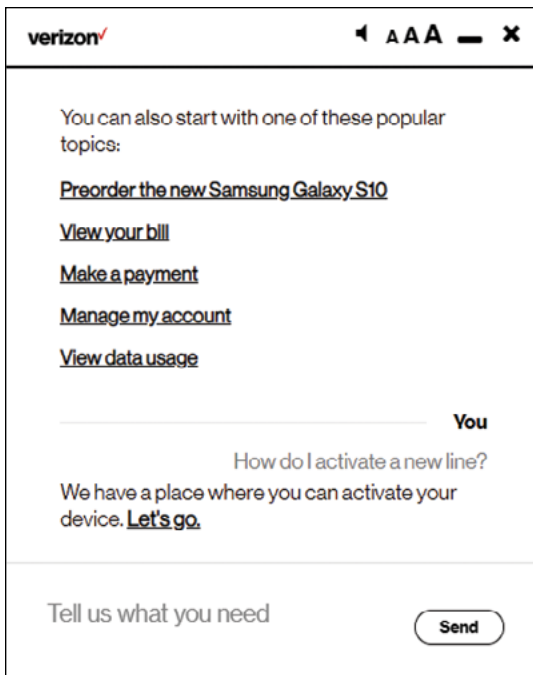


Figure 4. Example of Verizon's chatbot providing a link in the chatpane "Let's go"

It was harder to get responses from Sprint's chatbot because it forced us to use predetermined categories such as "Activate or swap device," "Billing questions," and "Device & Network." Some of our selected inquiries (see Table 1) fit the categories like "Activate or swap device," while in most others, it was difficult to determine which category they would potentially belong in. For example, when asking the Sprint chatbot about Real Time-Text, despite being able to enter free-form text, the chatbot still forced us to "Select a Topic" that attempted to categorize the inquiry. Unfortunately, the topics suggested did not fit, so we selected "Something Else" (see Figure 5), which allowed us to select from a wider but still limited list of options from a dropdown that also did not fit the inquiry. To proceed to a conversation with the chatbot, we selected what we thought were the best options, "Plans or add-on services" and then "Learn about service add-ons" (see Figure 5). However, when we were able to hold a conversation with the chatbot, it still did not fully understand our inquiry. We changed the entry to keywords and different phrasings to no avail. This is an example where the categories restricted our interactions negatively with the chatbot and did not help resolve our issue once we were able to enter free-form text to chat with the chatbot.

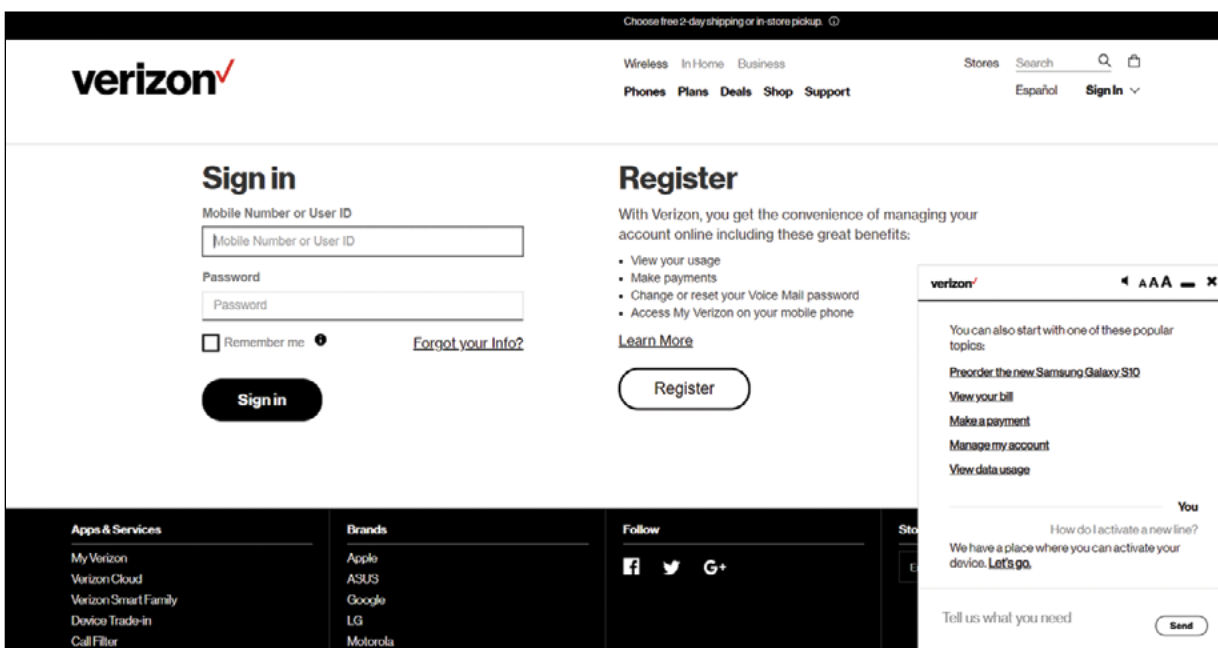


Figure 5. Example of Verizon's chatbot taking us to the login screen after selecting "Let's go"

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Figure 6 displays two screenshots of Sprint's chatbot interface, illustrating how it forces users to pick categories for inquiries without providing details about each category.

**Left Screenshot:** The chatbot starts with a greeting: "Let's get started. How can I help you today?". The user responds: "You: I want to activate real-time-text (RTT) but I don't know how." The chatbot responds: "Sprint: Got it. Here are some related topics I can help you with. Which of these would you like to do today?". Below the chatbot's response, there is a section titled "Select a topic" with four radio button options: "Text / call history or troubleshooting", "Activate your device", "Check usage or add data", and "Something else" (which is selected). A yellow "Continue" button is at the bottom.

**Right Screenshot:** The chatbot continues the conversation. The user responds: "You: I want to activate real-time-text (RTT) but I don't know how." The chatbot responds: "Sprint: Got it. Here are some related topics I can help you with. Which of these would you like to do today?". The chatbot then responds: "Sprint: OK. Please provide more information about your request by selecting one of these specific topics." Below this, there is a section titled "Select an option" with two dropdown menus. The first dropdown menu is labeled "Plans or add-on services" and the second dropdown menu is labeled "Learn about service add-ons". A yellow "Continue" button is at the bottom.

Figure 6. Sprint's chatbot forces users to pick categories for inquiries without providing details about each category

Figure 7 displays a screenshot of a chat transcript from Sprint, showing the chatbot's interaction with the user. The transcript is dated 2019-03-05 13:42:54.

**Your chat transcript:**

**Sprint :** Hello, and thanks for chatting with Sprint!

Let's get started. How can I help you today?

**You :** I want to activate real-time-text (RTT) but I don't know how.

**Sprint :** Got it. Here are some related topics I can help you with. Which of these would you like to do today?

**Sprint :** OK. Please provide more information about your request by selecting one of these specific topics.

**Sprint :** To keep your info secure, please sign in to MySprint at [sprint.com/login](https://sprint.com/login).

Even if you've already signed in, signing in now will let me verify your account information for our secure chat session.

**You :** real-time text

**Sprint :** I'm sorry, but it looks like that didn't work. Please try to sign in again at [sprint.com/login](https://sprint.com/login).

**You :** do you have real-time text?

**Sprint :** Hmm... I'm having trouble accessing your account.

**Sprint :** Let me transfer you to a specialist for more help.

Figure 7. Sprint's chatbot transcript fails to understand inquiry based on categories chosen (dropdown selections are not recorded in the transcript)

**Delivery format.** As described earlier, the chatbot responses were either Chatbot Providing or Link Providing. Sometimes the chatbot provided categories or topics to choose from as a way to help narrow the conversation before allowing free-form text entry, and sometimes the chatbot allowed us to enter free-form text into the chat pane from the beginning. We then conversed with the chatbot and rephrased or reentered inquiries as needed.

**Accuracy.** The chatbot confirmed with us whether or not the response was what we were looking for after each response. When the chatbots gave us an answer to our inquiry (either as a Chatbot Providing or Link Providing response), the answer may not have been accurate at the beginning. After a little back-and-forth, all of the responses were accurate (100 percent). The links properly took us to the information we were looking for and answers given by the chatbot in the chatpane were able to resolve problems posed through the inquiries. That being said, accuracy here does not mean success in information retrieval. If the chatbot was unable to provide the response, rather than emphasize or link to incorrect information, the chatbot would transfer us to a human agent. Overall, Verizon was generally able to answer most questions without transferring us to an agent, whereas Sprint was essentially unable to answer any inquiry and had to transfer us to an agent for most of the inquiries.

## Findings 2: Differences and Similarities Between Search and Chatbots

A comparison between the information tools—search and chatbots—on the telecommunication companies' help websites revealed several differences in the way these tools accepted information-related queries and the formats in which they delivered information solutions. The following sections describe our observations from our data analysis in the second test case.

### Search and chatbot inquiry input

To input an inquiry in search, we looked for a search icon on the home page of both websites (Sprint and Verizon). We used the inquiry keywords for the search (see Table 2). For chatbots, we used the keywords in place of a question. For example, to inquire about recycling the device, we used the keyphrase "Recycle my device." Both tools were similar in terms of understanding keywords. In both tools, keyword inquiries were followed by relevant

information topics. However, the displayed results differed in multiple ways.

### Search and chatbot response and delivery

**Structure of response.** Chatbots use a back-and-forth messaging system to provide information or help topics to users. Once a query was entered in the chatbot's message box, the chatbot responded with the solution to the inquiry or asked additional questions to get more information about the query from the user. While the chatbot algorithm processed the inquiry, a message such as "Agent is typing..." was displayed. For four out of the five queries, both chatbots asked for additional details. For example, for the inquiry "New line" the chatbot asked more information about the plans, number of lines, type of phone, etc., before it displayed information (solution) about the plans available to get a new line.

The search took an equal number of steps for this inquiry. The support web page on the site provided a list of topics to obtain help on this topic. However, we had to make appropriate selections to go to the page that displayed the plans communicated by the chatbot. While chatbot conversations asked us for our choices in the form of inputs, in the search results, we had to navigate through topics and choose the appropriate ones to gain information. If the choices did not produce results, the chatbot repeated the question; whereas, in search, we had to go back manually to the point where we started navigation by clicking the browser's back button. After providing the necessary information, the chatbot asked us whether we had other questions before signing off.

**Time until accurate response.** For this test, we measured accuracy based on whether the response to inquiries provided step-by-step instructions on solving problems stated by inquiry keywords (see Table 1). For search, the time required was less than one minute if we were able to make correct choices among the links displayed. Each chatbot inquiry took at least two minutes for all the messages to be relayed and responses to be received.

**Accuracy.** Search was more accurate in providing help content than chatbots. We were able to get help information for all inquiries for Verizon and four out of five inquiries for Sprint in less than three web pages linked through the search results section. The Sprint



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chatbot could only answer one out of five inquiries, and the Verizon chatbot could answer four out of five.

**Delivery formats.** Another significant difference between chatbot and search responses was the format of delivery. Search provided help information through links to web pages that could be printed or converted to PDF using browser features. Sprint also provided a feature to share the content via social media. Search page links can also be saved using the bookmark features on browsers in case we wanted to go back to the content later. To save chatbot conversations for Verizon, we had to copy and paste the entire conversation to save it for local (later) use. Sprint's chatbot provided the email feature to save conversations. If we chose email, the conversation was emailed to us in a few minutes.

### DISCUSSION

Despite the increasing popularity of AI, chatbots, conversational interfaces, and deep learning, chatbot research is still largely missing from the technical communication academic journals. On the other hand, trade publications have been actively trying to find answers to the questions: “Is there nothing we, as technical communicators, can do? And is there something we should do?” (Ames, 2019). The July/August 2019 issue of *Intercom*, dedicated to content design and development for machine delivery, was an attempt to document technical communicators' perspectives surrounding this new demand and what we can do to address it. Andrea Ames (2019), contends that technical communicators have the skills necessary to embrace writing for these genres as well. We need to use our “advocacy, research, strategy, architecture, design, development, and delivery skills to create the right content and present it exactly when and where the right people need it” (p. 4). The primary differences between traditional technical writing and writing for chatbots point to storage formats, size of content chunks, and delivery medium. Although technical communicators are not yet often involved in writing for chatbot interactions, we should be. Technical communicators are capable of studying interactions by considering what is humanistic about technology use based on an understanding of audiences who would be engaging with it or through it (Ranade & Swarts, 2019). Thus we can say that technical communicators

can adapt these skills and fulfill content requirements of genres like chatbots.

Our exploratory study looked closely at chatbots to learn more about interactions, types of content, delivery, and usability of chatbots. Additionally, studying the differences between chatbots and traditional tools like search further helps focus on the differences in the characteristics of these information tools. The findings partially address questions about how the work and skills of technical communicators can be extended (not replaced) while writing for machines when incorporated into the design and development of information tools. In the following sections, we draw conclusions from our findings, especially about the usability of chatbots and their information design.

### Study Limitations

Our study has several limitations. First, we conducted the study in the Spring of 2019 over the course of several months. This is a small timeframe, and the chatbots we used could be updated and improved since then, which would cause variation with our results. Additionally, we chose very specific, existing chatbots rather than creating a chatbot ourselves or doing a larger, random sampling of chatbots. This means our data set is also small and specific to the telecommunications industry. While a smaller data set might seem limiting, our choice gave us better control over the information inquiries—we wanted to test the chatbots and search without worrying about whether or not the information existed or was reliable. This enabled us to focus on the chatbot and search results without questioning the reliability of the information. This is why despite some limitations, we feel that our results and the heuristic we developed provide a good starting place for both practitioners and researchers to begin considering chatbot information design.

### Desirable and Undesirable Characteristics of Chatbots

We observed that the chatbot feels flexible and helpful when it has these characteristics:

- Ability to enter free-form text into the chat pane,
- Back-and-forth conversation that allowed the chatbot to drill down to the content we were looking for,
- Specificity of information provided in the chat pane,

- Functionality to open redirects in another tab (navigating to links provided by the chatbot did not exit us out of the chat pane), and
- Ability to automatically record conversations.

We also observed that the chatbot feels inflexible or unhelpful when:

- Free-form input is not allowed and/or there are topic restrictions based on categories,
- Answers vary and/or are inconsistent, and
- There is lack of automation for recording conversation.

Verizon's chatbot mostly embodied desirable characteristics. With Verizon, we were able to enter free-form text into the chat pane, have a conversation where the chatbot was able to determine the content we were looking for, the chatbot used both Chatbot and Link Providing responses, and link redirects were smooth without exiting the chat pane. However, we were not able to record the conversation easily through email or save the conversation as a PDF.

Sprint's chatbot mostly embodied undesirable characteristics. With Sprint, we were restricted to making selections from limited categories, and free-form text entry was not useful because we were immediately directed to choose a category afterwards. Additionally, Sprint's responses were varied and inconsistent, and we were not able to have a fluid conversation with the chatbot. These elements essentially made the chatbot unusable. However, we were able to save a transcript of the conversation through email, although category choices were not recorded in the transcript.

Neither chatbot was perfect or fit either description fully. In both chatbots, we would have preferred seeing more Chatbot Providing responses. This is seen as more usable because it means the user does not have to go extra places on the site or think about where to find the information they need (Krug 2014). Sprint's chatbot revealed the problems of only using a category approach—the responses and taxonomy were so limiting that the chatbot was unable to answer most of the inquiries. Verizon's chatbot also had categories, but they were at the beginning of the conversation and were optional for the user to select. This indicates that categories can be problematic if they are the primary or sole input method, especially without appropriate taxonomy and metadata infrastructure to support it.

## Comparing Search to Chatbots

In the comparative analysis between search and chatbots, we observed that search was more effective since search results were returned faster than chatbots' responses with fewer interactions and with more accuracy. However, chatbots can become more efficient over time with the use of proper architectures like NLP. The cost to build these architectures, including other requirements and returns on investment, must be closely compared before making decisions on which information tool to deploy on information websites.

## Chatbot Design Heuristic

Based on the findings from our studies, we created a chatbot design heuristic (see the Appendix for the tabular format). Researchers and practitioners can use this heuristic to help design, develop, and test chatbots from a high level. The heuristic is designed to help technical communicators to think about overall usability, information design, and accessibility.

### Heuristic: chatbot usability

The usability heuristic focuses on three categories: user input flexibility, role transparency, and self-awareness of limitations.

- **User input flexibility** focuses on the ability to provide information to the chatbot the way the user prefers. Essentially, this is allowing the user to provide free-form text entries that may be accompanied by suggested topics from the chatbot.
- **Role transparency** is making sure the chatbot identifies as a non-human entity. This is important for setting users' expectations as well as good ethical practices. If the chatbot identifies as non-human, users may be more forgiving of the chatbot's limitations and will also be able to accurately discuss the chatbot's suggestions if the issue is escalated to a human agent. Additionally, as automated assistants begin to enter our lives more pervasively, we believe it is significant to draw the line in identification between humans and non-humans as a good ethical practice.
- **Self-awareness of limitations** is the chatbot's ability to recognize when they are not able to address the user's problem and is able to seamlessly transfer the user to a human agent. The chatbot should be able to recognize when a user is frustrated or when all options available to the

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chatbot are exhausted as a sign that the chatbot is unable to assist the user and needs to send the user to a human agent.

### Heuristic: information design quality

The information design heuristic focuses on three categories: chatbot-provided content, link-provided content, chatbot conversation responsiveness.

- **Chatbot-provided content** means the chatbot is able to provide direct, concrete answers for the user within the chat pane. This is important because it means the user is able to obtain answers directly and efficiently, which is the entire goal for implementing a chatbot.
- **Link-provided content** means the chatbot directs the user with a link to a website or topic without exiting the chat pane. While chatbot-provided content is preferable, sometimes a link to a website or a specific topic is more appropriate. In these cases, links should go directly to specific locations on a web page that are relevant to the user (topic), unless the entire web page is relevant, such as a product-specific page.
- **Chatbot conversation responsiveness** refers to the chatbot's ability to converse with the user fluidly and, through conversation, determine what the user is looking for and deliver the information they need. The chatbot should be able to go back and forth with the user effectively to narrow the conversation and request.

### Heuristic: accessibility features

While accessibility was something we could not test, we felt it was important to include in the heuristic to ensure inclusive design. The two heuristic categories are perceivable and operable.

- **Perceivable** refers to compatibility with auditory senses and practically focuses on compatibility with screen readers and other assistive technologies. This is significant considering how chatbots may soon be the primary form of support communication.
- **Operable** refers to various ways users can engage with the chatbot. This includes the ability to tab through the conversation, skip over repetitive or stock content, use voice-to-text input, and use other input devices, such as a braille keyboard, eye-tracking software, hand wand, etc.

## CONCLUSION

Throughout our study, we sought to understand the usability design of chatbots and how chatbots compare to search. Based on the findings in the first test, conducted with just chatbots, we created a high-level design heuristic as an initial baseline into understanding how to consider chatbot usability, information design, and accessibility when designing a chatbot. The findings of the second test compared chatbots to search and considerations for preferring one over another.

Technical communication practitioners have several takeaways from the study. First, leveraging and integrating with existing content and CMS is important when planning chatbots' information design. This will reduce duplicated content and support content reuse. Second, ensuring this content has proper metadata tagging through a controlled taxonomy will make it easier for the chatbot to recognize keywords associated with particular topics and smaller pieces of content. This is critical for overall chatbot implementation, whether using NLP or relying solely on existing content.

This study also has several pedagogical implications. First, chatbots require base knowledge in other areas, such as information architecture, content management, and content strategy to ensure good information design planning (this ties with the practitioner takeaways), which helps the rhetorical negotiations and decision-making process while developing and publishing content. Second, audience analysis is important to understand the usability and conversation flow of the chatbot and forces students to consider questions such as "Does the chatbot always need a personality?" and "Where is the chatbot getting its information from?" Lastly, curricula should identify the use cases where search is more optimal for the user journey as opposed to chatbots. This enables students to recognize the strengths and weaknesses of delivering information on both information tools. Additionally, a rhetorical study of the chatbot genre can highlight other advantages and limitations of using chatbots for user advocacy and inclusivity purposes.

We hope that future research will pursue some of these ideas and use our heuristic to evaluate chatbots from other sectors and for other purposes. We specifically examined support chatbots, but medical and sales chatbots are also prevalent chatbot

implementations. We hope to expand the heuristic by testing diverse chatbots and continue to iterate and refine the heuristic with larger datasets. This study also paves the way for pedagogical research to look at how technical communicators can extend their work to add value to this new genre of communication.

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## APPENDIX

### Chatbot Design Heuristic

Objective	Goal	Good Chatbot	Average Chatbot	Poor Chatbot
<b>Usability</b>				
<b>User Input Flexibility</b>	Ability to provide information to chatbot the way the user wants to	Allows free-form text entry while suggesting potentially relevant topics or categories for the user to select to help narrow the information topic	Allows free-form text entry but does not provide relevant topics or categories for the user to select to help narrow the information topic	Does not allow free-form text entry and constricts user to predetermined topics and categories to choose from
<b>Role transparency</b>	Chatbot identifies clearly as a non-human	Chatbot clearly identifies as a non-human “digital assistant”	Chatbot identifies as non-human but this designation is not clearly stated. Chatbot may have a name	Chatbot does not identify as a human or non-human
<b>Self-awareness of limitations</b>	Self-recognition of inability to provide information and seamlessly transfer conversation to a human agent	Chatbot recognizes that the user is frustrated or it cannot provide the answer the user is looking for and transfers the user to a human agent within the same chatpane	Chatbot sometimes recognizes when a user is frustrated or that it cannot provide the answer. Chatbot may not transfer the user to a human agent and instead suggest calling support	Chatbot is not able to recognize when the user is frustrated or that it is not answering the question to the user’s satisfaction
<b>Information Design Quality</b>				
<b>Chatbot-provided content</b>	Provides relevant answers to a user within the chat pane	Provides relevant and accurate information to the user within the chatpane	Provides some information within the chat pane and may supplement with a link for additional information	Provides no information within the chatpane. always refers user to a link or to human agent
<b>Link-provided content</b>	Provides relevant links directly to website page or topic without exiting out of the chat pane	Link navigates users to specific information requested, either in the form of a webpage or topic. the chatpane remains open and retains the conversation	Link navigates to a web page with generally relevant information, but is not specific. the chatpane remains open and retains the conversation	Link does not link user to relevant information and/or link closes chatpane or erases chat history

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Objective	Goal	Good Chatbot	Average Chatbot	Poor Chatbot
<b>Chatbot conversation responsiveness</b>	Ability to converse with the user to drill down and determine the correct information required	Chatbot is able to converse with the user fluidly and logically to help drill down the information request	Chatbot is somewhat able to converse with the user fluidly. user may have to reframe questions to get the chatbot on the right track	Chatbot is unable to converse with the user and either suggests specific topics or categories or transfers user to human agent without any previous conversation
<b>Accessibility Features</b>				
<b>Perceivable</b>	"Available to the senses, like vision and hearing, either through the browser or through assistive technologies like screen readers and screen magnifiers"	Compatibility with most assistive technologies and screen readers	Compatibility with some assistive technologies and screen readers	No compatibility with assistive technologies and screen readers
<b>Operable</b>	Ability to tab through conversation and skip over repetitive or stock introductory information, provide voice-to-text input, and use other input devices (braille keyboard, eye tracking, head wand, etc.)	Full operability with tabs, voice-to-text, and other input devices.	Some operability with tabs, voice-to-text, and other input devices	No operability with accessible controls and inputs

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# Post-Fact Fact Sheets: Dissociative Framing as a Strategy to Work Past Climate Change Denial

By Beth J. Shirley

## ABSTRACT

**Purpose:** This article presents a new rhetorical model for science and technical communication—specifically climate change communication—which the author is calling *dissociative framing*, in which climate change can be dissociated from the behaviors necessary to mitigate the human contribution to climate change, while positive associations are formed with those behaviors. This model serves as an alternative to the knowledge deficit model still in use in much science communication and is applicable both for students and practitioners of technical communication.

**Method:** The model was developed by examining Matthew Nisbet's work on framing in conjunction with Perelman and Olbrechts-Tyteca's work on dissociation. I conducted a coded rhetorical analysis of two fact sheets produced by the Utah State University Extension Office with information on how their audience can change personal behaviors to mitigate their personal impact on climate change. I suggest how a dissociative frame would present the information more effectively.

**Results:** A dissociative framing model can provide practitioners in technical and professional communication (TPC) a way to work around science skepticism and motivate action, especially when working with short, community-based genres, and can provide teachers of technical communication with a heuristic for instructing students on how to best engage a skeptical audience.

**Conclusion:** While rural communities in the United States are especially prone to climate skepticism, it is important that they be informed and empowered to make the necessary behavioral changes to mitigate the human impact on climate change. Fact sheets published by extension services provide an excellent opportunity to inform and empower. A dissociative framing model provides a clear way to empower these communities with knowledge of how to mitigate their impact on climate change without diving into the political issues embroiled in climate science.

**Keywords:** Environmental science communication, rural engagement, framing, dissociation

## Practitioner's Takeaway:

- Technical communicators can employ a rhetorical model called *dissociative framing* in which the communicator dissociates an intended action from a notion, political or ideological, that is perceived to be incompatible for that specific audience.
- For example, when communicating about how and why to make certain behavior changes with regard to climate change, such as reducing

energy consumption or planting trees, the communicator may choose to avoid discussing climate science altogether. In this way, the communicator can dissociate these behaviors from the perceived-to-be controversial topic and to re-associate the behaviors with values the audience is more likely to view as compatible, such as saving money or building resilient communities.

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### INTRODUCTION

While the scientific community maintains consensus on climate change as a human-driven, social justice issue (IPCC, 2018), many Americans seem confused or unconvinced by the data that has been presented in nearly every way imaginable (Howe, Mildemberger, Marlon, & Leiserowitz, 2015). This lack of consensus among the public and politicization of the issue has led to a lack of action by governments, corporations, and individuals. Rhetoric of science and technical communication scholars have worked to understand what our role is in this *wicked* problem (Blythe, Grabill, & Riley, 2008; Cagle & Tillery, 2015; Ceccarelli, 2011; Coppola & Karis, 2000; Druschke, 2014; Druschke & McGreavy, 2016; Herndl, 2014; Herndl & Cutlip, 2013; McGreavy et al., 2016; Palmer & Killingsworth, 1992). When the data is out there, do we need to keep pumping it out in new and more engaging ways, or can there be a more methodical approach? How do we make the science any clearer? How do we work with communities and groups whose identities may be wrapped tightly around issues pitted against environmentalism (e.g., coal mining, timber extraction)? And what can we do to motivate individuals to act on climate change?

With the recent trend of doubt in science and mistrust of science-producing institutions among the general population of the United States (PEW, 2017), the question of how we motivate action on climate change may need to be reexamined or reframed: How important is it to first make the science clear? In an era referred to colloquially as the “Post-Fact” or “Post-Truth” era, when misinformation is almost more readily available than truth, and when there is little time left to act (about ten years as of this writing, according to the latest IPCC reports), we need to convince people to *act* quickly, not just to accept the science.

Increasing scientific literacy is, of course, important for the long haul. Yet despite the wealth of readily available information already translated for the public in the forms of daily news articles, websites, government-issued climate reports, and blockbuster documentaries, only 17% of Americans say they are “alarmed” about global warming and say it is a top voting priority, while 10% say they are “dismissive” and tend to oppose all climate action (Roser-Renouf et al., 2016). Many of these methods of environmental

communication rely on what is known as the *knowledge deficit model*, in which the author assumes there is a gap in the audience’s knowledge that must simply be filled before the audience will be willing to take action. But problems with accepting and acting on climate science, and science in general, run deeper than a simple lack of publicly available information, as scientific information becomes embroiled in political debates and tied to specific ideologies.

Even more troubling than the extensive doubt and denial of climate science, however, is the discovery that even those who are concerned about climate change are not likely to alter their behaviors (Hornsey et al., 2016; Kellstedt, Zahran, & Vedlitz, 2008; Lazo, Kinnell, & Fisher, 2000; Rabinovich, Morton, Postmes, & Verplanken, 2012) or even political action (Roser-Renouf et al., 2016). Meanwhile, emboldened by the perceived apathy or dismissal from the public, political entities in the United States continue to roll back regulations designed to mitigate climate change and cut incentives designed to encourage the development of sustainable energy resources (Davenport, 2019; Fears, 2019; Stetch Ferek & Puko, 2019). The problem is not just that the science lacks clarity; the problem is that the threat posed by climate change is conveniently denied or ignored in favor of maintaining our current lifestyles. I contend that 1) technical communicators working in climate change communication can shift their more immediate communication strategies from trying to move people from denial to acceptance toward new methods that motivate people to direct action, and 2) that teachers of technical communication can encourage students to think beyond the knowledge deficit model.

In this article, I present *dissociative framing*: an approach to technical communication in which the writer distances critical takeaways from contextual information that may be perceived as objectionable or controversial and re-associates the takeaways with acceptable information or outcomes. For example, if an author knows that a given audience is deeply embedded in the coal mining industry, they can more effectively motivate behavioral change regarding the environment by leaving coal mining out of it altogether. We also know that coal mining has been pitted against climate activism in general, and therefore, a dissociated frame that seeks to inform and empower a rural, coal mining community toward energy-reducing behavior

would avoid the issue of climate change altogether and would instead work to associate these behaviors with things understood to be of strong value to that specific audience, such as saving money.

*Dissociative framing* makes a case for people to adopt new behaviors toward mitigating anthropocentric climate change by focusing on reasons other than mitigating climate change for those behaviors and practices. Especially in shorter communication genres, such as the extension fact sheets I discuss in this article, it may be necessary that the audience's associations with the issue of climate change (or any politicized issue) be assessed and possibly dissociated from the behaviors the author is writing about, while building new associations with ideas and values the audience holds to be positive.

### Apparent Contradictions

The term *fact sheet* may lead to an assumption that these documents are purely informative and therefore should not also be considered persuasive documents. Yet scholarship in the field of technical communication has called for a move away from this binary that may be perceived between informative or persuasive and to instead emphasize that all technical writing is rhetorical and should be considered persuasive, both in practice and in teaching. For example, Joswiak and Duncan (2020) examined best-selling textbooks in the field and found this delineation between informative and persuasive to be a common theme that “contradicts practitioners’ roles as persuasive communicators” (p. 29). Despite this delineation in textbooks, the authors cite scholars going back 30 years agreeing that all communication, even communication that is presented as “informative only,” is persuasive and should be considered as such by the communicator (Bazerman, 1988; Gross, 1996; Keith, 1997; Knoblauch & Brannon, 1984; Kynell, 1994; Ornatowski, 1992; Toulmin, 2003; Tebeaux & Dragga, 2018). Joswiak and Duncan (2020) contend “therefore, it is important to recognize that all writing operates persuasively in either implicit or explicit ways,” and must be treated as such by practitioners and taught as such by instructors (p. 38). This is especially true in a political climate when the facts, themselves, have strong ties to distinct ideologies.

To address this complication with science communication, I present a new rhetorical model: *dissociative framing*, based on Perelman and

Olbrechts-Tyteca’s (1969) work on the concept of *rhetorical dissociation* and Nisbet’s (2009; 2010) work on *framing*. Framing, Nisbet argues, is often done unconsciously by communicators but is always part of communication as it involves how the writer chooses to arrange and focus information. When done mindfully, framing can be effective at jumping party lines and deeply embedded tribalisms. *Dissociation* is the splitting of ties between a concept that is undesirable or even hated by a given audience from the concept the author is trying to persuade that audience to accept, forming new associations to replace the old. For example, an advocate for Planned Parenthood may talk to someone who is anti-abortion by framing the conversation around the services the organization provides aside from abortion, such as preventative women’s health care, omitting or downplaying discussion of abortion. While the organization is already closely associated with the practice of abortion, it may still be beneficial to form this new association with women’s health.

Dissociated framing requires a close examination of the audience to first understand what important factors are at play, what sort of industries are important, what values does this community hold, and what frames might be effective at motivating action. Such an examination may reveal useful anomalies. For this article, I will look specifically at rural communities in Central Utah as an example site for examination. Rural here refers to an incorporated area with fewer than 2,500 people (U.S. Census Bureau, 2010). These areas tend to have less access to the internet and therefore information (Hale et al., 2010; Saleminck et al., 2017; Whitacre & Mills, 2007). In a phenomenon described as the “digital divide,” citizens in these areas often rely on print media made available in the mail or at events, either due to lack of access or resistance to adapting to digital technologies. Rural communities are also often overlooked in research due to “urban bias” (Chambers, 1983), and many researchers are apprehensive or unwilling to work with them because of perceived or real sharp political differences (Walsh, 2013), which compounds the marginalization of these communities. Thus, it is especially important for universities to reach out to serve rural areas. This mission is often directly met through land-grant university extension programs and their engagement events and publications, including what are known as fact sheets, brief, informational documents that provide



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valuable information on agricultural developments and other technical material, including research done at the university. These fact sheets may often be written using the deficit model, but they are a perfect opportunity for practitioners of technical writing to utilize dissociative framing.

### Fact Sheets

If we are to mitigate the human impact on climate change, it is going to involve major changes to human behavior. While this must include wide-sweeping policy changes, in a capitalistic democracy, that also means communicating the science and the necessary solutions clearly to the public, both so that small-scale changes can be made and so that the belief in the need for larger changes can influence policy makers (Dietz et al., 2009). While there may be lower trust in science coming from universities (PEW, 2017), extension programs within those universities may still be a trusted resource as they have served as a reliable mediator between the universities and rural communities. Fact sheets published in partnership with these extension agencies, then, provide an opportunity to engage with these communities quickly in a familiar genre that gets right to the point. Because of the brevity, however, it is important that they not spend page space on information their audience will perceive as unnecessary or biased. These fact sheets are a perfect example of a genre that can benefit from dissociative framing as outlined here.

To consider how some technical communicators are working in rural communities, this article will briefly examine two examples of these fact sheets published through the Utah State University Extension Office for their current rhetorical strategies, consider the audience, and offer suggestions for how a dissociative framing model would change these strategies. These fact sheets, written by students and researchers at Utah State, demonstrate one type of rhetorical strategy that is currently employed by scientists trying to persuade people to create adaptive behaviors in the face of climate change rooted in the assumption that an understanding of the human causes of climate change will motivate action (the knowledge deficit model).

The goal of this article is not to diminish the work of these authors or to imply that these fact sheets were not written with great care and thoughtfulness—in fact, I am certain they were. The goal is to consider

how these fact sheets may be construed by a rural Utah audience and how future fact sheets and similar genres could be written to better engage rural communities in adapting behaviors with regard to the environment.

## LITERATURE REVIEW

Climate change has been recognized widely by the scientific community to be accelerated by human activity, most notably by fossil fuel consumption, deforestation, and activities increasing ocean acidification (Cox et al., 2000; Dansgaard et al., 1993; IPCC, 2014; IPCC, 2018; Parmesan & Yohe, 2003). While a large focus has been placed (rightly) on changing policy to mitigate the human impact on climate change, household actions could create a “wedge” to curb the dramatic rise in carbon (Dietz et al., 2009), and some sociological studies have suggested that creating environmentally friendly habits in individuals cultivates a stronger environmental ethic and support for protective and proactive legislation (Bina & Vaz, 2011). Whether the emphasis on mitigating climate change should be in creating and changing policy or in changing individual behavior, technical communications that focus on informing and empowering changes in everyday behaviors work toward both of these goals.

Palmer and Killingsworth's *EcoSpeak* (1992) introduced technical communication to the concept of *eco-humanism*, the philosophy that human interests are intertwined with environmental interests, and the authors argue environmental communication should draw attention to this bond between humans and the natural world. Unfortunately, with a dramatic increase in venues for airing of opinion and “facts” (social media, town hall meetings, online public fora, etc.), especially when it comes to environmental issues, we have seen an increased polarization of attitudes toward nature, and subsequently climate change. Still, *eco-humanism* has become a common theme in technical communication scholarship, and with good reason. Palmer and Killingsworth also emphasize careful analysis to understand an audience's relationship to nature to more appropriately frame scientific information. This is a great step toward getting rid of the simple assumption that we must first convince an audience to accept climate change science before they will act on it. Yet there are broader questions worth asking, primarily

whether or not it matters if acceptance of climate change science must precede behavioral change, and if trying to force such acceptance might actually do more damage by associating the environmentally friendly behaviors and policies with publicly rejected and politicized science.

Scholars in technical communication have since demonstrated the need to engage stakeholders directly in scientific literacy and communication (Druschke & McGreavey, 2016; Simmons, 2008), but this work can take years we do not have and may overlook stakeholders who do not have a voice. From a social justice standpoint, it is imperative that technical communicators move audiences toward fast action, as those most impacted tend to be marginalized groups that have limited access to resources (IPCC, 2014). We have passed the point of having the luxury of patiently changing individuals' attitudes through deliberative civic engagement and participation in the science. The focus needs to shift toward direct engagement and participation in the solutions.

While stakeholder engagement is certainly important work for the long term, in the short term, we can empower individuals to take action by framing that action around immediate benefits. While continuing efforts to increase scientific literacy in underserved communities, we can also utilize existing avenues of communication and practice dissociative framing to make necessary environmental action palatable and engage stakeholders in being part of the solution.

While scholars in the field may have recognized the exigency for more complex rhetorical models than the knowledge deficit model, Cagle and Tillery's (2015) review of science communication research across multiple disciplines revealed that much of the literature is still reliant on a one-way communication model, and some scholarship they analyzed argues that the deficit model has something to offer climate change communication practice. Cagle and Tillery call for technical communicators to act as advocates in risk communication, including risks exacerbated by climate change, and for more targeted forms of audience analysis. What is needed is a rhetorical strategy for climate change communication that does not rely on the knowledge deficit model. Dissociative framing offers such a strategy.

## DISSOCIATIVE FRAMING

In the field of communication science, the concept of framing is well-studied and demonstrated to be a productive heuristic for considering what makes for effective communication (Nisbet, 2009, 2010; Scheufele, 2004), and framing has been applied by researchers in other fields as well, including health (Koon et al., 2016), technology (Granqvist & Larulia, 2011), and climate change (Dickinson et al., 2013). Matthew Nisbet's work on rhetorical framing suggests that tailored frames offer a way to jump party lines. Nisbet mentions it is important to first recognize that "Framing is an unavoidable reality of the communication process," that whether we are aware of it or not, we are framing an issue whenever we communicate about it, and we can be more effective if we are aware of it (2009, p. 15). Nisbet (2010) uses an example of the National Academy of Science persuading the public of evolution as a foundation for biology classes. The frames the authors found to be effective allowed for co-existence of faith and evolution: rather than focusing on divisive aspects of the debate, framing evolution as the pathway to advances in modern science was far more acceptable to the public. By affirming that faith and science can co-exist, the authors allowed the audience to be more comfortable with scientific theories they had previously outright rejected.

Herndl, Rockenbach, and Ritzenburg (2014), like Nisbet, acknowledge that facts are not enough. In their appendix to Herndl's edited collection *Sustainability: A reader for writers*, the authors recommend appealing to emotions as well as to logic (pathos and logos) by connecting a human story, narrative, or other rhetorical appeal to the facts of the problem. They also recommend that the author consider what rhetorical appeal (or frame) might work for a specific audience or else make a broad range of appeals to fit a broad audience. In either case, Herndl et al. recognize that multiple appeals of rhetoric must be engaged in order for climate change communication to be effective.

Framing offers a way to acknowledge the importance of a unique audience's values and beliefs when communicating science. The trouble is that the facts themselves have become politicized and are already associated in most people's minds with certain ideologies. As with evolution, the evidence regarding climate change has been accessible long enough

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for people to align themselves with one side or the other; the work of the technical communicator is to reach past those alignments. This is where the idea of *dissociation* becomes important when we are not only communicating facts but attempting to persuade our audience to change behaviors or when behaviors become more important than beliefs, as is now the case with climate change.

Perelman and Olbrechts-Tyteca (1969) defined *dissociation* as “techniques of separation which have the purpose of dissociating, separating, disuniting elements which are regarded as forming a whole or at least a unified group within some system of thought: dissociation modifies such a system by modifying certain concepts which make up its essential parts” (p. 190). Unlike framing, dissociation has not been studied as thoroughly or empirically in the field of communication, but scholars have studied its efficacy for political and legal argumentation (Lynch, 2006; Ritivoi, 2008; Stahl, 2002). While technical communicators might strive to remain unbiased and avoid politics altogether, dissociative framing offers a way to present information that is often cognitively connected to political issues without politicizing it.

Dissociative framing considers not only what frame is going to be effective but also how to make communication more impactful by removing associations that create cognitive dissonance given specific tribalisms we know to be present in a given audience. For example, a communicator separating the idea of renewable energy resources from the objectionable concept of climate change allows for open discussion of solar plants and wind farms without wading into the complicated networks of tribalisms and ideologies associated with climate change, even if mitigating climate change is the original goal of the communicator. By dissociating these adaptive behaviors from the abstract and potentially controversial issue of climate change and constructing a rhetorical frame that re-associates them with tangible and uncontroversial results (saving money, becoming industry leaders, creating jobs), technical communicators can work toward cutting those complex associations and make these ideas of clean energy, tree planting, and other adaptive behaviors compatible with our audience’s beliefs and concerns. If we do not pair suggestions for making these behavioral changes with the idea of climate change, if we instead solely frame the behavior

as compatible with existing values, the suggestions can be accepted even for someone who outright dismisses climate change science.

I am certainly not advocating that dissociative framing replace all science communication and that we cease to translate complex and highly politicized climate change data. It is still incredibly important that we continue to work toward building scientific literacy, especially in underserved communities such as rural areas. The perceived alienation of marginalized rural communities by the scientific community (Parker, 2018) may be a contributor to the very associations that render a need for dissociative framing. However, while the science is still considered controversial and political, and while it has also been demonstrated that increased understanding of climate science does not lead to increased action (personal or political) dissociative framing can help technical communicators persuade audiences to take the necessary actions. Ultimately, these actions can help reduce their carbon footprint toward placing the “wedge” on carbon emissions (Dietz et al., 2009) while we continue to attempt to influence policy and larger corporate changes.

When it comes to this kind of complex, multidisciplinary, global problem, digestible genres like fact sheets need to be designed to engage individuals quickly, without expending limited page space on the “controversial” scientific concepts, and with the intent of getting their informed involvement in creating sustainable, resilient, and adaptive behaviors. The limitation of their short length should be seen by authors as an opportunity to move past denial of climate change and develop other frames that work toward encouraging action. Dissociative framing as a rhetorical strategy is a way to quickly persuade audiences to take necessary action.

### EXAMPLE: EXTENSION FACT SHEETS

I have closely examined the rhetorical strategies employed in two fact sheets—both from the Utah State Extension office—whose goal is to empower their audience to make some kind of behavioral adaptation toward mitigating the individual’s contribution to climate change. Fact sheets are short, succinct presentations of information on home gardening, agriculture, natural hazard preparedness, local fishing and hunting, and other home and life improvement

topics as well as reports on the research produced by the university. They are designed to provide quick bites of information to members of the community about the research going on at the university and to synthesize research from other institutions that may be relevant but not easily accessible.

Fact sheets are usually written either by students getting some experience synthesizing research or by faculty working alone or with students to translate research into language more easily understood by the general public. Fact sheets provide an example of science writing, usually taught by technical communication and composition instructors, and reflects the lessons learned in those classrooms. The fact sheets analyzed here cover two different approaches to mitigating climate change, but both of these approaches focus on things that can be done at the household level (saving energy and planting trees.) Both are also framed around the impact these actions have on climate change. These examples demonstrate that there is a need for technical communicators to develop comprehensive rhetorical strategies for these community action-oriented genres that do not rely upon the deficit model and to teach these models in the technical communication classroom.

It is important to note before looking at the examples that in most rural counties in Utah, many citizens are employed by the coal mining industry, and a good deal of the Western United States' fossil fuels are processed here (Millard, Emery, Sanpete, Sevier, San Juan, and Carbon Counties). These areas tend to run

strongly conservative on most issues and tend to more strongly deny human causes of climate change than the rest of the country (Howe et al., 2015). For example, Millard and Emery counties each deviate about negative 15 points from the national average on climate change acceptance (Howe et al., 2015). Yet, these rural Utah counties also express overwhelming support for funding research into renewable resources. That support is still a few points below the national average, but at 80% in both Millard and Emery counties, this is perhaps an unexpected stance in the heart of Western coal and cattle country (Howe et al., 2015). We know, then, that there is an understanding of the need for long-term economic stability in the area and that there is overwhelming support for new developments toward that stability. We also know that while renewable energy infrastructure is less widely accepted, it is still more acceptable to this audience than the idea that humans are contributing to climate change.

By contrast, the authors of these fact sheets are situated in Logan, a university town that is far more likely to accept that humans are contributing to the causes of climate change (Howe et al., 2015), and they are embedded in academic departments in which denial of climate change science is rare and likely discouraged. When I began this research, I assumed that the authors' primary audience was rural communities in Utah. After discussing my work with a colleague who is more closely connected to one of the authors, I learned that, in fact, these sheets are often written with university donors in mind as the primary audience and rural

Appeal to	#of occurrences	Example
Value of outdoor recreation and natural resources	2	"Coal fuels most of Utah's energy...adds mercury to our waterways...mercury in ducks and fish restricts Utah's family recreation"
Value of scientific data	1	"Household energy use contributes 23% of energy use; the average American emits 20 tons of CO2 every year."
Value of climate health	5	"Reducing your energy consumption at home will aid climate stability!"
Value of saving money	8	"While LEDs are more expensive earlier on, they still save money because they last a long time and have very low energy use."
Value of independence	1	"Implementing these technologies and ideas will reduce the carbon footprint and energy dependency of your home."

**Table 1. Rhetorical appeals in Fact Sheet 1 in the order of first appearance. Natural resource preservation, scientific data, and climate health are all appealed to before personal savings is mentioned**

## Post-Fact Fact Sheets

communities as the secondary audience. Donors are more likely situated close to the university if they are in Utah at all. They are looking at fact sheets not for their content but as an example of the university engaging in outreach. These authors are under conflicting influences, so some of the complications with writing in such limited genres involves writing for a diverse set of audiences. However, these sheets are still a prime opportunity for researchers at the university to engage rural communities, and considering rural communities as a primary audience would not negate the donors as a secondary audience.

### Methods

The two fact sheets (see Figures 1 and 2) analyzed here were chosen because they explicitly encourage behaviors toward mitigating climate change and therefore provide an example of how some extension documents are currently modeled toward this goal. They are not intended to serve as a representative data set, rather as examples of models that do not use dissociative framing. In conducting a coded rhetorical analysis of two examples of this genre, I do not intend to imply that all fact sheets are written in the same way or with the same audience analysis approach. Rather, these examples demonstrate that there is potential for a new approach that would be more mindful of the audience's values and attitudes.

To assess the framing strategies of these fact sheets, I first tagged and coded their argument appeals. I used an open coding methodology, meaning instead of having a set of predefined codes, I made a note of the appeals and identified what values the authors were appealing to (see Appendix A); I then developed categories based on the recurring themes and noted the number of occurrences of each of these appeals (see Tables 1 and 2), including overlaps of those occurrences. Finally, I used those codes and categories to model the communication frames that are revealed in these fact sheets and describe what assumptions were made about the audience based on the frames used to encourage the different adaptive behaviors. I then conducted a holistic analysis of the assumptions made and the values perceived in each fact sheet to draw conclusions about what frames the authors are working within. In my discussion, I also include findings from external research to suggest what alternative frames might be more effective with these particular audiences and to

suggest why climate change acceptance need not be, and even in some cases should not be, a precursor to recommending these behavior changes.

### Fact Sheet Number 1: "Easy Steps to Reduce Your Energy Bill"

#### Summary


This fact sheet begins by discussing the dangers of burning fossil fuels (coal in particular) and connecting it to the detriment of Utah's air, water, and other natural resources. The next paragraph cites statistics on overall energy consumption in the United States and how much the average American contributes to that each year. Slightly more than one page of the two-page fact sheet lists ways to reduce your energy bill and includes some of the basic science behind why those changes are more energy efficient for things like installing LED light bulbs, home wind turbines, and solar panels. The fact sheet is short and uses plain language, citing prominent climate science research, but the framing of the fact sheet reveals that the real motivation the authors have for writing this is to inform and encourage people to protect the environment, a sharp turn from the title's suggestion to save money. The fact sheet frames an argument for behaviors to reduce energy around the human impact on climate change and associates those behaviors with attacks on the fossil fuel industry.


#### Analysis

While the fact sheet has eight rhetorical appeals to the value of saving money, these appeals are buried and scattered behind descriptions of climate change and link to human activity, a rhetorical move that risks losing the audience's interest altogether. As the fact sheet begins heavy on climate science, it reflects the deficit model. By beginning with communicating the larger environmental problem in plain language, the authors demonstrate their belief that access to climate science is what will motivate people to action, and by associating the issue with our air, water, and recreation in two swift sentences, they attempt to drive home the long-denied science and persuade their audience to accept.

The title acknowledges that there may be other factors that have nothing to do with climate change that would motivate people to make these adjustments, but the immediate shift with the first paragraph appears somewhat misleading, like a rhetorical bait-and-switch. Notably, the immediate reference to fossil fuels brings




**UtahStateUniversity**  
 EXTENSION SUSTAINABILITY



## Easy Steps to Reduce Your Energy Bill


**Blake Thomas, Brett Tingey & Roslynn Brain**  
Department of Environment & Society

### Energy Use & the Environment

Fossil fuels supply most of Utah's energy needs. Any process using fossil fuels, however, emits carbon dioxide (CO<sub>2</sub>), mercury, and oftentimes other contaminants that stress Utah's beautiful natural resources (Dresselhaus & Thomas, 2001). Most electricity in Utah is fueled by coal-fired power, which adds mercury to our air and waterways. Increased mercury in ducks and fish have resulted in restrictions for Utah family pastimes, such as fishing and duck hunting.

In 2010, 23% of energy consumption in the United States was residential, totaling 22.2 quadrillion Btu (EIA, 2010). A quadrillion Btu is about equal to the amount of energy in 45 million tons of coal, or 1 trillion cubic feet of natural gas, or 170 million barrels of crude oil (Maxwell, 2009). Annually, the average American emits 20 tons of CO<sub>2</sub>, approximately the weight of 3.33 adult male African elephants (EIA, 2011). Reducing your energy consumption at home will aid climate stability and save you money on your utility bill each month!

This fact sheet offers ideas on how to reduce your energy consumption using new technologies and conservation practices. With proper implementation, you'll be well on your way to enjoying a lower energy bill and a healthier environment.



Open windows freshen inside of your home and cut your energy costs when temperatures are comfortable.

### Light Emitting Diode (LED) Bulbs and Programmable Thermostats

Choose LED bulbs when replacing old bulbs. LED bulbs convert electrical currents into light using semiconductors. LEDs are approximately 80% more efficient than incandescent bulbs, and CFLs are about 75% more efficient. However, CFL bulbs contain mercury, so if you use them, please recycle at your local hardware store or city/county environmental department. Traditional incandescent bulbs are less efficient because they give off 90% of their energy as heat (U.S. Department of Energy, 2013). While LEDs are more expensive earlier on, they still save money because they last a long time and have very low energy use.

**According to the U.S. Department of Energy (2013), ENERGY STAR-qualified LEDs use less than 25% of the energy compared to traditional incandescent bulbs and last up to 25 times longer.**

Install programmable thermostats to automatically regulate heating and cooling of your home.

- These are available in most hardware stores for as low as \$25.
- Wrap your water heater with a thermal (insulation) blanket to reduce heat loss. Prices range from \$12-\$40.
- If your hot water tank is warm to the touch, additional insulation is needed. Adding insulation to a hot water tank can reduce heat loss by 25%-45%. The reduced heat loss will save you 4%-9% in water heating costs (DOE, 2011).

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Figure 1. Page 1 of Fact Sheet Number 1

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up a real problem for many in the state of Utah. Recall that in many of the rural communities these fact sheets are intended to reach, fossil fuels are a major source of income, and citizens in these counties that rely on coal mining for their livelihoods are among the least likely to accept climate change or trust climate scientists (Howe et al., 2015). As more power companies switch to more renewable energy sources (often at the request of consumers), coal production is down, and plants are closing all over the state. The request that the audience reduces their own fossil fuel consumption, especially coal, by making these behavioral and lifestyle adaptations ignores the very tenuous political environment in these rural communities. The audience in rural Utah is likely to respond negatively and dismissively to any scientific information that begins by blaming their community's primary industry. Advising on how to reduce an electric bill is one thing; associating that action with changes that may diminish a community's livelihood is another.

### Implications

A dissociative framing approach to these fact sheets might look first at the communication goals and consider why people might be motivated to change behaviors in these communities. For example, these rural communities tend to be in topographically flatter areas, unlike Logan where Utah State is situated between two mountain ranges. The campus is prone to heavy smog due to seasonal inversion, a naturally-occurring process by which cold air gathered between mountain ranges traps warm air; in trapping that warm air, the inversion also traps heavy amounts of pollution that would otherwise rise up into the greater atmosphere, resulting in what is known as a red air day. On these days, the air is tangibly polluted and it becomes difficult to breathe. Because of the flat topography, the counties where most coal mining takes place do not experience this phenomenon, even though coal burning contributes to it. The damage that fossil fuels do to our air is not as visible to an audience in rural Utah as it is to the authors in the valley town. Inversions may be recognized as an urban problem, as they occur far more in the urban centers of the state, including Salt Lake City. Appealing to rural citizens for help in reducing this largely urban problem may even create associations with rural-urban tensions. The way the science of climate change is introduced in this

fact sheet assumes that the audience simply does not know about the issue and the impact of coal on the environment, when the problem is that the issue is deeply politicized. Framing the actions the audience needs to take around these issues drives negative associations with those political issues, when a frame that dissociates them could be far more effective.

Such a limited genre has to balance between being concise and being considerate of the values and environmental attitudes of the intended audience. The hook is in the monetary benefit of making these changes. Regardless of the acceptance or denial of climate change, the audience can appreciate the information and be empowered to reduce their energy consumption. I would never argue that we should ignore science or avoid an opportunity to increase scientific literacy. However, with such a short amount of space, the fact sheet may be more effective by avoiding controversial topics and considering a more tailored, dissociative frame.

### Fact Sheet Number 2: "Trees and Climate Change"

#### Summary

The second fact sheet is somewhat longer (7.5 pages including references) and also begins with an overview of the science of climate change. The authors go into much more depth in tree science, including the specific details of how deforestation affects climate change, the immediate climate of the Global South, and how planting more trees can combat climate change. The frame of this fact sheet is similar to that of the first: Introduce the big problem and the evidence of that problem, then move to what can be done about it—the traditional format found in research papers and proposals.

The first 2.5 pages are dedicated to reiterating the science that explains climate change and why it presents a problem for nature and for humans in the long run. The authors move from what is causing the climate to change to what effects this change is already having and is predicted to have. The next 2.5 pages explain the science of how trees can be used to combat climate change. The next page (6) abruptly jumps to other possible reasons that planting trees in your own yard is a good idea: reduced energy demand, shade, a reduced energy bill, and controlled snow deposits. For the first reason, the authors here cite some studies that say that planting



# UTAH

## FOREST FACTS



NR/FF/032 (pr)



## Trees and Climate Change

By: Megan Dettenmaier, Michael Kuhns, Bethany Unger, Darren McAvoy

**What is Climate Change?**

Over the last 650,000 years, the earth has experienced seven cycles of glacial advance and retreat. The earth's climate fluctuates naturally; however, we are in a very real and significant warming trend that is human caused and temperatures are increasing faster than previously observed warming cycles.

**Greenhouse gases**

Scientific consensus indicates that significant increases in greenhouse gas emissions by humans are causing climate change. Greenhouse gases include nitrous oxide, water vapor, methane, and carbon dioxide. They become trapped in the earth's atmosphere and retain heat, which sometimes is called the "greenhouse effect." Although greenhouse gases can be produced naturally, human activity cause emissions of

This fact sheet describes the complex relationship between forests and climate change based on current research. We explain ways that trees can mitigate some of the risks associated with climate change. We detail the impacts that forests are having on the changing climate and discuss specific ways that trees can be used to reduce or counter carbon emissions directly and indirectly.



Photo Credit: The Nature Conservancy

Figure 2. Page 1 of Fact Sheet Number 2



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Appeal to	#of occurrences	Example
Value of science	9	Explanation of "greenhouse effect" caused by human activity
Value of hope for the future	2	"depending on whether humans alter their behavior or not, this warming climate will likely have severe consequences for us and for the future of our planet."
Value of helping those less fortunate	1	"Hardest hit, perhaps, are impoverished countries in the equatorial zone."
Value of reducing carbon footprint, mitigating climate change	7	"There are two ways people can change this trend: 1) reabsorbing carbon dioxide from the atmosphere, or 2) reducing carbon dioxide (and other greenhouse gas) emissions. Trees can help us do both."
Value of personal health	1	"the values of urban trees are financial, ecological, and they even can improve people's physical and mental health."
Value of saving money	5	"Thoughtful tree placement can reduce cooling costs by 30% in the summer, and heating bills by 20-50% in the winter."
Value of world leadership	5	"An important result of the 2015 Paris climate talks, that included more than 150 world leaders, was the emphasis on the importance of preserving forests."

**Table 2. Rhetorical appeals made in Fact Sheet Number 2, in order of first appearance**

100 million trees in cities could save \$2 billion a year in the United States, though how exactly this happens or who gets to keep that money is not explained. The second reason is more straightforward: Plant a tree in your yard and you could actually reduce your summer air conditioning cost by up to 30 percent and reduce your winter heating cost by up to 50 percent. This is because the tree provides both shade and insulation if planted in a proper place. The third reason is that trees can break cold and hot winds, again reducing your heating and air conditioning bills. The last is that trees can control snow deposits, "reducing the energy required to plow roads, parking lots, and driveways" (p. 7). Finally, the last page pans out quickly from the homeowner's yard to bring the fact sheet back to the global issue of climate change, forming an association between local tree planting and global forest preservation.

### Analysis

The title strongly reflects the authors' motivation for writing this fact sheet but leaves some mystery as to the usefulness of the content for a non-scientific audience. The first few sections also reflect the deficit model by focusing on the science of trees and climate change upfront, while the personal benefits of planting a tree are buried toward the end. What might really motivate the adaptive behavior recommended is the savings in energy bills and overall more stable temperatures in the hometown, but that gets lost in the highly politicized

science of global climate change. Deforestation of the rainforest has been happening and on the public's radar for the last century, so why would an audience in rural Utah care about it now?

Again, this fact sheet reflects the rhetorical strategy that frames an argument for action around climate change. The heavy emphasis on what is causing climate change, what will happen as a result, and how it can be mitigated takes away from the potential the fact sheet has to encourage people to plant more trees and to empower them to be part of a greater solution. It assumes that in order for people to be convinced to do this, they have to accept the science of climate change, and in doing so, it associates planting trees with one side of a highly politicized issue. While this audience may be turned away from the rest of this fact sheet because of the focus on an incompatible idea (climate change science), they may be interested in the information about how planting trees can improve their own lives.

### Implications

A dissociative frame might instead avoid talking about the broader science and offer more space on the immediate effects on the individual taking action, on advice for planting the tree, location, watering, what types of trees do well in this climate, etc. Planting trees is already often associated with environmental activism, and therefore may be seen as taking a political stance.

A dissociative frame would remove consideration for the greater environment and instead work to inform the audience of the localized benefits to planting trees. This would empower them with specific details on how to most effectively implement this change, by dissociating tree-planting from tree-hugging and forming new associations between tree-planting and values such as saving money, improving home value, and building local resilience.

## DISCUSSION

Although improving scientific literacy is important, especially when it comes to issues that put life on this planet at risk, shorter, more limited genres are not the place to try to push research on what the audience considers a controversial topic. It is important for technical writing students and practitioners working in such limited genres to understand that climate change is perceived as controversial and that framing these behavior changes around mitigating climate change or reducing fossil fuel use may actually have the opposite of the intended impact. What may be reiterated constantly and consistently in the halls and classrooms of a university's natural resources department may be tied to more complicating factors in the rural areas those researchers are meant to be benefiting.

These documents should reflect the value system of the audience, focusing on what is going to get the community to engage constructively. These areas are impacted by dwindling water availability and by a rising heat index; the communities most uniquely reached by this genre of Utah State Extension fact sheets are prone to climate change denial, but they are also in favor of funding renewable energy (Howe et al., 2015). They are also closely connected to fossil fuel industries. Whether they make their living mining coal or not, they are surrounded by it, and they are impacted daily by the powerful rhetoric of the coal industry. A dissociative frame for these fact sheets would avoid discussion of climate change and coal mining altogether and re-associate the recommended behaviors with positively held values, such as saving money and building a more resilient community. By looking at this audience closely and considering the existing associations with climate change data and fossil fuel industries, authors can better strategize communication for the complex connections that form human attitudes and motivate behaviors. In

doing so, technical communicators find unexpected avenues for encouraging behavior changes.

In any given community, there are distinct and easily discernible factors that contribute to attitudes toward the environment and climate change science. These factors impact how certain frames of climate change communication are interpreted, but they may also expose avenues for encouraging support for adaptations and adaptive behaviors themselves. A dissociative frame for Fact Sheet Number 1 would cut all mention of climate change and the fossil fuel industry and instead re-associate the energy-reducing behaviors with values like saving money and creating job opportunities; a dissociative frame for Fact Sheet Number 2 would also cut all reference to climate science and the role trees play in regulating Earth's atmosphere and would re-associate tree planting with positive personal values, such as saving money and increasing the value of one's home and the local community.

Thinking past denial of climate change in framing behaviors and even policy can open up new frames for encouraging the changes that are needed to mitigate the effects of climate change. Dissociative framing allows the communicator to consider what new associations may be formed that can be more persuasive than pre-existing and highly politicized science.

## CONCLUSION

Technical communicators are in a unique position to advise scientists and others working to persuade the public to take specific actions with regard to climate change, and they teach future scientists and technical writers. Especially when writing and speaking in shorter genres such as fact sheets, it may be crucial to practice dissociative framing to avoid correlations that are perceived to be controversial and to associate necessary actions with positive values.

From *EcoSpeak* onward, the field of technical communication has been aware that audiences are complex in their relationships to nature; a thorough understanding of climate change is not necessary to motivate environmentally-minded action. But much of science communication has continued under the assumption that climate change acceptance must come before climate change action. Dissociative framing allows technical communicators to move around the



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blockade of denialism in the “Post-Fact era” and focus their arguments instead on creating positive associations with adaptive behaviors. They can dissociate these behaviors from politicized science and move around denial straight on toward action.

I recommend practitioners consider the following questions when engaging communities in shorter, action-oriented genres:

- What ideas and terms have come to be politicized with this audience? What might I need to dissociate from the behaviors I want them to adopt or ideas I want them to consider?
- What are the major industries in this area? How are these industries both impacting and impacted by climate change?
- Based on the answers to the previous question, what topics and frames might we want to avoid?
- What sort of natural environment is the audience a part of, and what are the challenges within that environment?
- What other values might this audience have besides environmental concerns (saving money, saving time, religious values, community values, etc.)? How might those values be re-associated with the behaviors or attitudes we want them to adopt?

Teachers of technical communication also have a unique opportunity to encourage students to utilize appropriate rhetorical strategies when writing about important scientific information. Students are acutely aware that science has become highly politicized, from climate change to vaccinations to genetically-modified organisms, and they are often already invested in finding ways to break down barriers between scientific research and their local or home communities. Technical communication instructors can engage their students in thinking beyond the deficit model to find unique ways of conveying important scientific information to a variety of audiences. This heuristic approach may begin by asking them to think about what people in their communities care about most and what they are most invested in. Having students list out what their communities care about and the major takeaways they want to convey to that community may help them to seek out new connections and new avenues of scientific engagement. It may also help them think beyond the deficit model toward an approach like dissociative framing.

With the climate changing more rapidly and risks of natural disasters increasing every day, we do not really have time to spend designing our arguments first to overcome climate change denialism and then to persuade to action. With short genres that have the ability to reach otherwise disengaged and dismissive audiences, writers need to spend the time and page space getting right to the point and presenting alternative reasons for making the adaptive behaviors and creating new associations with those behaviors. Frames toward creating adaptive behavior should be focused on tangible effects of those behaviors that extend beyond what seems abstract or controversial to the audience. By creating rhetorical frames that dissociate necessary action from controversial and unpalatable ideas, technical communicators can focus on forming good environmental habits regardless of acceptance or denial of climate change.

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## Post-Fact Fact Sheets

### APPENDIX A

Synthesized Argument	Appeal to	Assumes
<b>Easy Steps to Reduce Your Energy Bill</b>		
"Fossil fuels supply most of Utah's energy ... stress Utah's beautiful natural resources."	Value of natural resources	Audience does not know about energy, fossil fuels, and their impact on the environment.
"Coal fuels most of Utah's energy ... adds mercury to our waterways ... mercury in ducks and fish restricts Utah's family recreation."	Value of natural resources	Audience does not know coal can be detrimental to immediate environment.
Household energy use contributes 23% of energy use; the average American emits 20 tons of CO2 every year.	Value of scientific data	Audience does not know household energy use contributes to climate change.
"Reducing your energy consumption at home will aid climate stability and save you money on your utility bill each month!"	Value of climate health, value of saving money	Audience connects reducing energy consumption to climate change.
"With proper implementation, you'll be well on your way to enjoying a lower energy bill and a healthier environment."	Value of saving money, value of climate health	Audience wants to save money and help the environment at the same time, and may be willing to invest to save money in the future.
"While LEDs are more expensive earlier on, they still save money because they last a long time and have very low energy use."	Value of saving money	Audience wants to save money and may be willing to invest to save money in the future.
Purchase insulation for water heater.	Value of saving money	Audience wants to save money and may be willing to invest to save money in the future.
"More Cost Saving, Easy Steps"	Value of saving money	Audience wants to save money, audience does not want to make drastic changes.
"Home wind turbines emit zero carbon and, ... can generate income for residents via selling excess electricity generated back to local utility company."	Value of climate health, value of saving money	Audience wants to save money and help the environment at the same time, and may be willing to invest to save money in the future.
"Solar is a great option for sunny Utah ... cost of solar has decreased dramatically."	Value of saving money	Audience wants to save money and may be willing to invest to save money in the future.
"Implementing these technologies and ideas will reduce the carbon footprint and energy dependency of your home."	Value of climate health, value of saving money, value of independence	Audience wants to save money and may be willing to invest to save money in the future, wants to help the environment at the same time.
"This will allow you to save money and reduce your personal impact on the environment."	Value of saving money, value of climate health	Audience wants to save money and save the environment.



Synthesized Argument	Appeal to	Assumes
<b>Trees and Climate Change</b>		
"Earth's climate fluctuates naturally, but we are in a warming trend that is human-caused and making things warmer."	Value of science	Audience needs to know that global warming is human-caused.
Explanation of "greenhouse effect" caused by human activity.	Value of science	Audience needs to know what causes global warming.
"Depending on whether humans alter their behavior or not, this warming climate will likely have severe consequences for us and for the future of our planet."	Value of science, value of hope for the future	Audience needs to be convinced global warming has consequences for humans and the planet.
"The use of fossil fuels to generate electricity is the largest source of atmospheric carbon dioxide emissions in the U.S."	Value of science	Audience needs to know what causes global warming.
Consequences of rising temperatures in the global climate include "longer growing seasons, later first-frost dates, changes in precipitation patterns including more precipitation falling as rain and less as snow, increasing frequency of severity of droughts and heat waves, and an increase in the frequency, duration, and intensity of hurricanes."	Value of reducing carbon footprint, mitigating climate change	Audience understands why longer growing seasons, later first-frost dates, and less snow pack are bad, perceives themselves to be at risk of these weather occurrences.
"Hardest hit, perhaps, are impoverished countries in the equatorial zone."	Value of helping those less fortunate	Audience cares about people in impoverished countries.
"Sea levels have risen more than 6 inches in the last century, and are predicted to rise another 1–4 feet by 2100. Climate scientists estimate that the current warming patterns may lead to an ice-free arctic by 2050 (Notz & Stroeve, 2016)."	Value of climate science, value of the future	Audience needs to know the global consequences of climate change, cares about and understands the significance of the arctic.
"There are two ways people can change this trend: 1) reabsorbing carbon dioxide from the atmosphere, or 2) reducing carbon dioxide (and other greenhouse gas) emissions. Trees can help us do both."	Value of reducing carbon footprint, mitigating climate change	Audience needs to know how trees can help reduce climate change.
Explanation of how trees trap and store carbon dioxide.	Value of science, value of reducing carbon footprint, mitigating climate change	Audience needs to know how trees can help reduce climate change.
"Ecologist and carbon cycle expert Dr. Richard Houghton, from the Woods Hole Research Center, estimates that aggressive rural forest management, including tree planting, could offset half of the current carbon emissions on earth over the next decade."	Value of science, value of reducing carbon footprint, mitigating climate change, value of hope for the future	Audience needs to know how trees can help reduce climate change.

## Post-Fact Fact Sheets

Synthesized Argument	Appeal to	Assumes
"The values of urban trees are financial, ecological, and they even can improve people's physical and mental health."	Value of saving money, value of personal health	Audience needs to know the full benefits, personal and global, that planting trees has.
"The usefulness of urban trees in combating climate change is not so much in absorbing carbon dioxide as it is in using them to reduce our carbon footprint."	Value of reducing carbon footprint, mitigating climate change	Audience wants to reduce carbon footprint.
"By establishing 100 million mature trees around residences in the U.S., we could save \$2 billion a year in energy costs, along with reducing the associated carbon dioxide emissions (Akbari et al. 1988, 1992, Donovan & Butry, 2009)."	Value of science, value of saving money, value of reducing carbon footprint, mitigating climate change	Audience wants to save money on energy costs, wants to reduce carbon emissions.
"Thoughtful tree placement can reduce cooling costs by 30% in the summer, and heating bills by 20–50% in the winter."	Value of saving money	Audience wants to save money on energy costs, and is willing to invest money to do so.
"Tree and shrub windbreaks can reduce your energy demands for heating and cooling by up to 30% by reducing infiltration of cold winds in the winter and hot winds in the summer."	Value of saving money	Audience wants to save money on energy costs, and is willing to invest money to do so.
"Tree and shrub windbreaks can reduce your energy demands for heating and cooling by up to 30% by reducing infiltration of cold winds in the winter and hot winds in the summer."	Value of saving money	Audience wants to save energy, lives in an area impacted by large snowfall.
"Climate change is predicted to lengthen growing seasons, which at first may appear positive for forests, but the story is complex."	Value of science	Audience needs to understand why longer growing seasons are not good for forests. [Neglects to consider other growth the audience may consider to be positively impacted from longer growing seasons.]
"An important result of the 2015 Paris climate talks, that included more than 150 world leaders, was the emphasis on the importance of preserving forests."	Value of world leadership, value of reducing carbon footprint, mitigating climate change	Audience supports Paris climate talks.
"Reducing energy consumption and increasing urban and rural forests are two key actionable items going forward. Planting trees and preserving existing forests will not eliminate excess carbon emissions, but these actions can play a role in helping reduce greenhouse gas emissions and mitigating negative effects of climate change."	Value of reducing carbon footprint, mitigating climate change	Audience is now informed enough about climate change to receive the call to action based on the desire to mitigate effects of climate change.

# The Mandative Subjunctive in Technical Writing, or the Gap Between Subconscious and Conscious Grammatical Knowledge

By Edward A. Malone and Elizabeth M. Roberson

## ABSTRACT

**Purpose:** In technical writing, the consistent use of the present subjunctive in mandative *that*-clauses can promote stylistic clarity by distinguishing the not-yet actualized from the already actualized. A grammar rule requires the use of the present subjunctive in such contexts. We tested a group of STEM majors at our university to see whether they were predisposed to use the present subjunctive in mandative *that*-clauses when they were composing new content or editing existing content.

**Methods:** We administered two versions of a performance-based elicitation test in eight writing classes: (1) a complete-the-sentence version, in which the mandative *that*-clause lacked a complete predicate, and (2) a fill-in-the-blank version, in which the mandative *that*-clause lacked only a verb phrase (i.e., simple predicate). The former required composing new content, while the latter required editing existing content.

**Results:** In the mandative *that*-clauses across both versions of the test, the present indicative was used in 51 percent of the responses, while the present subjunctive was used in 28 percent. The present subjunctive was used in 249 out of 720 responses (35 percent) on the complete-the-sentence version of the test, while it was used in 191 out of 828 responses (23 percent) on the fill-in-the-blank version.

**Conclusions:** The students used the mandative subjunctive frequently, but they used the mandative indicative more frequently. They were more likely to use the mandative subjunctive when they were generating complete predicates (applying the grammar rule subconsciously in composing/drafting) than when they were supplying only simple predicates (applying the grammar rule consciously in editing/revising).

**Keywords:** editing, grammar, style, clarity, consistency, verb mood

## Practitioner's Takeaway:

- The indiscriminate use of indicative and subjunctive verb forms in mandative *that*-clauses can result in inaccurate, unclear, or inconsistent writing.
- In most cases, technical writers and editors should use the subjunctive rather than the indicative or modal *should* in mandative *that*-clauses for American audiences.
- The gap between subconscious and conscious grammatical knowledge may interfere with competent revision and editing; closing that gap requires formal study of grammar.

## Mandative Subjunctive in Technical Writing

### INTRODUCTION

Decades ago, a technical editor who was well known in the STC community described the subjunctive as a relic—one of the “old forms” of “days of yore”—that was being replaced by the indicative in most contexts (Whittaker, 1977, p. 192). Her discussion reveals that she had an imperfect understanding of the subjunctive. She recognized correctly that “If I were you” is a subjunctive clause (an example of the so-called *were*-subjunctive), but she also incorrectly described the following sentence as subjunctive: “If the indicator light turned on, the machine would be . . .” Nowhere in her discussion does she mention the present subjunctive. Her impression that the subjunctive is disappearing from the English language was based partly on her own inability to recognize it. As Einsohn and Schwartz (2019) state, “subjunctive forms are hard to spot” (p. 357).

The subjunctive stands out when *be* (one form of the present subjunctive) replaces *is* or *are* (present indicative forms) or when *were* (the only form of the past subjunctive) replaces *was* (a past indicative form). Subjunctive clichés such as *so be it* and *as it were* seem like oddities. Consider the following example: “If being careful means delays, then so **be** it. Such delays are precautions, as it **were**, and should be welcomed.” But the subjunctive is not always so conspicuous. The mandative subjunctive—a common form of the present subjunctive—is relatively inconspicuous when the verb is something other than *be*. Someone might say, “They’re demanding she **resign** immediately,” without ever realizing that *resign* is a subjunctive form. It is the mandative subjunctive—not the *were*-subjunctive—that is ubiquitous in American English.

Recommending, requesting, and proposing are important speech acts in technical, scientific, and business writing, and the mandative subjunctive is used at the sentence level to perform or report these speech acts through verbs such as *insist*, *require*, *suggest*, *propose*, *stipulate*, and *request*. As experts in the use of workplace language, technical writers and editors should be able to recognize and consciously use the mandative subjunctive. A technical writer should know how and why the meaning of *He insisted they be first* is different from the meaning of *He insisted they are first*, and a technical editor should understand why *be submitted* should not be changed to *is submitted* in the sentence “The agency requires that the application be submitted

by no later than June 1.” A grammar rule (see Einsohn & Schwartz, 2019, p. 358) requires the use of the subjunctive form *be submitted* in this context because it emphasizes that the action has not yet been actualized (i.e., not yet happened).

A writer or editor can improve stylistic clarity by using the mandative subjunctive to reinforce the meaning of “not yet actualized.” Whereas the difference between “We propose that the project **is finished**” (indicative = actualized) and “We propose that the project **be finished**” (subjunctive = not yet actualized) is a difference in meaning, the difference between “The SHARE team asks that there **is** an EMS contact at each participating agency” (Welch, 2017, p. 1; original sentence, mandative indicative) and “The SHARE team asks that there **be** an EMS contact at each participating agency” (our revision, mandative subjunctive) is a matter of clarity. Our revision is clearly a reported directive, whereas the original sentence might be mistaken momentarily for a reported question. Did the writer mean *if* or *why* instead of *that*? In such constructions, when a subjunctive verb form is used, the mandative meaning is unambiguous: the action or condition has not yet been actualized. When an indicative verb form is used, the meaning “not yet actualized” is more difficult to extract from the context. For this reason, the mandative indicative is sometimes referred to as “the covert mandative” (Huddleston & Pullum, 2002, p. 995).

Likewise, a writer or editor can improve stylistic consistency by using subjunctive verb forms in all mandative *that*-clauses. In the sentence “It is imperative that she **know** the rules and **follows** them,” the two bolded verbs should be either *knows* and *follows* (indicative) or *know* and *follow* (subjunctive), but the latter set more clearly expresses the mandative meaning. The inconsistency in verb forms is easy to detect in this example because the two verbs are close together, but sometimes they are far apart even in the same *that*-clause. Moreover, as we will show, it is not uncommon for a writer to use several mandative *that*-clauses in a short procedural document and shift unwittingly between subjunctive and indicative forms. As editors and teachers, we advocate for stylistic consistency because it usually enhances communication by reducing the reader’s interpretive burden.

The prevalence of the mandative subjunctive in American English is well established in the literature.

For example, in a recent corpus-based study of mandative clauses of various types (e.g., subjunctive, indicative, modal), Waller (2017) found that the use of the mandative subjunctive was greater in 2006 than in 1931 in both American English (AmE) and British English (BrE). In mandative clauses within the AmE corpora, the subjunctive variant was used 56 percent of the time in 1931, 76.9 percent in 1961, 72.8 percent in 1992, and 61.2 percent in 2006. In mandative clauses within the BrE corpora, the subjunctive variant was used 13 percent of the time in 1931, 11.9 percent in 1961, 27.7 percent in 1991, and 28.5 percent in 2006 (Waller, 2017, pp. 241, 283). These findings suggest that the mandative subjunctive is far more common in AmE than in BrE and that the subjunctive has long been the dominant mandative variant in AmE. In present-day AmE, the mandative subjunctive is “frequently met with” (Kjellmer, 2009, p. 246).

Because we believe that the use of the present subjunctive in mandative *that*-clauses promotes semantic accuracy as well as stylistic clarity and consistency in technical writing, we conducted an experiment to determine whether our STEM college students—future subject matter experts and writers in the workplace—would use the mandative subjunctive in the prescribed way. Our research questions were influenced by previous studies of the mandative subjunctive as well as discussions of the subjunctive mood in technical communication textbooks and handbooks:

**R1.** How often will the students use the mandative subjunctive in test sentences containing mandative trigger words? (We wanted to see whether they are predisposed to follow the grammar rule of using the present subjunctive in a mandative *that*-clause.)

**R2.** Will they use the mandative subjunctive more often in drafting/composing (i.e., generating the complete predicate of a mandative *that*-clause) or revising/editing (i.e., supplying the simple predicate in an otherwise complete *that*-clause)?

To answer these questions, we constructed and administered two versions of an elicitation test: (1) complete the sentence, in which the mandative *that*-clause lacked a complete predicate, and (2) fill in the blank, in which the mandative *that*-clause lacked only a verb phrase or simple predicate. In our experience as writers

and editors, supplying a word missing from someone else’s sentence is editing, whereas composing a complete predicate (e.g., deciding what to say about a given subject) is generating new content or composing. Contrast “It is vital [trigger word] that the user \_\_\_\_\_ all procedures” (fill in the blank with a simple predicate) and “It is vital that the user . . . ” (complete the sentence with a complete predicate). The former offers very limited options, whereas the latter is comparatively wide open.

We found that, across both versions of the test, the following mandative variants were prevalent in the responses: the indicative (used in 51 percent of the responses), the subjunctive (28 percent), and modals (at least 10 percent). In other words, in more than two-thirds of the responses, the students did not follow the prescriptive rule of using the present subjunctive in a mandative *that*-clause. However, they were more likely to use a subjunctive verb form when they were composing (generating the complete predicate of a clause) rather than editing/revising (merely plugging in a missing verb). The subjunctive was used in 35 percent of the responses on the complete-the-sentence version of the test and 23 percent on the fill-in-the-blank version. In two of the four classes taking the complete-the-sentence version, the subjunctive was the dominant mandative variant in responses. More than 80 percent of the students in our sample used the present subjunctive in at least one response.

The dominance of the mandative indicative in our sample challenges the commonly held assumption that the mandative indicative is a Britishism (e.g., Algeo, 2006) and suggests that, after graduation, our students will use the mandative indicative in workplace writing in spite of the ambiguities it can create. The frequency of the mandative subjunctive in our sample supports the often-repeated claim that the mandative subjunctive is in wide use by Americans (e.g., Hundt, 2018) and suggests that our students will likely shift inconsistently between mandative indicative and subjunctive forms in workplace writing. In an age when instruction in grammar is no longer emphasized in U.S. high schools and colleges, few writers and editors learn about the mandative subjunctive, and yet it should not be ignored by writers in revising text, editors in correcting and improving text, and instructors in evaluating writing.

The decline in our students’ use of the subjunctive when they were editing/revising as opposed to



## Mandative Subjunctive in Technical Writing

composing points to a gap between their conscious and subconscious knowledge of grammar. The expansive repertoire of grammar rules that the students have internalized from experience and use subconsciously in composing (performance) may be hampered by the limited repertoire of school-learned rules that they apply consciously in revising and editing (analysis). This gap between conscious and subconscious knowledge of grammar has implications for writing, editing, and the teaching of writing because grammatical constructions used effectively in spontaneous writing may be “corrected” with less effective constructions in revising and editing.

### A BRIEF TUTORIAL ON THE MANDATIVE SUBJUNCTIVE

Verb mood reflects the communicator’s attitude toward the content of his or her utterance—whether that content is regarded as real (factual, already actualized) or unreal (counterfactual, hypothetical, not yet actualized).<sup>1</sup> In traditional grammar, English had three inflectional moods: the indicative (real), the imperative (unreal), and the subjunctive (unreal). Few contemporary grammarians accept this traditional paradigm, but many grammarians still regard the subjunctive as an inflectional mood in English.<sup>2</sup> (See Appendix A for a brief explanation of how the understanding of verb mood in English has evolved from traditional grammar to contemporary linguistics.)

The subjunctive mood in English can be divided into two main types: the past subjunctive, also called the *were*-subjunctive, and the present subjunctive, including the mandative subjunctive (Depraetere & Reed, 2006; Waller, 2017). These types are past and present in appearance, but not necessarily in meaning. The present subjunctive, for example, can refer to past, present, or future time: “The agency **requests/asked/will insist** that the application **be submitted** on time.” Because we are concerned specifically with the present subjunctive in mandative *that*-clauses, we will forgo a detailed discussion of the past or *were*-subjunctive.

In form, the present subjunctive and present indicative may be distinct in some contexts and non-distinct in others. For example, “It is important that **each user have** the same experience” (present subjunctive) is distinct from “It is important that **each user has** the same experience” (present indicative), but “It is important that **I/you/they have** the same experience” (present subjunctive) is identical to “It is important that **I/you/they have** the same experience” (present indicative). The latter set is said to be “non-distinct.” In Table 1, we have bolded the indicative and subjunctive forms where they are different. Note that, even when the indicative and subjunctive are non-distinct in the affirmative, they are distinct in the negative: “It is important that **they not have** the same experience” (present subjunctive) versus “It is important that **they do not have** the same experience” (present indicative).

One type of present subjunctive is the *formulaic*, so called because the verb is used in a set phrase or cliché (Quirk, Greenbaum, Leech, & Svartvik, 1985, pp. 157–158). Although subjunctive verb forms are usually located in subordinate clauses in present-day English, an archaic feature of these set phrases is that the subjunctive form is often (though not always) located in a main clause: *Far **be** it from me to . . .* (indicative: *it **is** far*), *God **bless** you!* (indicative: *God **blesse**s*), *If it **please** the court, . . .* (indicative: *it **please**s*), ***Perish** the thought!* (indicative: *The thought **perish**es*), etc. There are far more examples of the present formulaic subjunctive (e.g., *if need **be***) than the past formulaic subjunctive (e.g., *as it **were***).

Outside of these set phrases, the present subjunctive form is sometimes found in conditional clauses introduced by *if*, *on condition that*, *provided that*, *unless*, *in case*, and *whether*; adversative clauses introduced by *lest* and *for fear that*; and purposive clauses introduced by *so that* and *in order that* (Huddleston & Pullum, 2002; Waller, 2017). The following sentence is an example of a conditional clause with subjunctive *be*: “Turning up evidence of aliens on far-off exoplanets—**be** they mats of bacteria or grazing behemoths—will require giant space telescopes, exotic technology and a dose of good luck” (NASA, 2016). Note that the

1 The technical terms for real and unreal are *realis* and *irrealis*.

2 Studies of the inflectional or morphological subjunctive in English linguistics include Auer (2008); Berg, Zingler, and Lohmann (2020); Crawford (2009); Deshors and Gries (2020); Hundt (2018); Hundt, Hoffman, and Mukherjee (2012); Kastronic and Poplack (2014); Kjellmer (2009); Övergaard (1995); Peters (1998); Schluter (2009); Schneider (2011); Serpollet (2011), and Waller (2017).

Table 1. Contrast in indicative and subjunctive forms

		Present Indicative	Present Subjunctive
Singular	First Person	that I find (active) that I <b>am</b> (copular or linking) that I <b>am given</b> (passive) that I <b>do not find</b> (negated) that I <b>am not</b> (negated) that I <b>am not given</b> (negated)	that I find that I <b>be</b> that I <b>be given</b> that I <b>not find</b> that I <b>not be</b> that I <b>not be given</b>
	Second Person	that you find that you <b>are</b> that you <b>are given</b> that you <b>do not find</b> that you <b>are not</b> that you <b>are not given</b>	that you find that you <b>be</b> that you <b>be given</b> that you <b>not find</b> that <b>not be</b> that I <b>not be given</b>
	Third Person	that he/she/it <b>finds</b> that the manager <b>is</b> that the manager <b>is given</b> that he/she/it <b>does not find</b> that the manager <b>is not</b> that the manager <b>is not given</b>	that he/she/it <b>find</b> that the manager <b>be</b> that the manager <b>be given</b> that he/she/it <b>not find</b> that the manager <b>not be</b> that the manager <b>not be given</b>
Plural	First Person	that we find that we <b>are</b> that we <b>are given</b> that we <b>do not find</b> that we <b>are not</b> that we <b>are not given</b>	that we find that we <b>be</b> that we <b>be given</b> that we <b>not find</b> that we <b>not be</b> that we <b>not be given</b>
	Second Person	that you find that you <b>are</b> that you <b>are given</b> that you <b>do not find</b> that you <b>are not</b> that you <b>are not given</b>	that you find that you <b>be</b> that you <b>be given</b> that you <b>not find</b> that you <b>not be</b> that you <b>not be given</b>
	Third Person	that they find that the managers <b>are</b> that the managers <b>are given</b> that they <b>do not find</b> that the managers <b>are not</b> that the managers <b>are not given</b>	that they find that the managers <b>be</b> that the managers <b>be given</b> that they <b>not find</b> that the managers <b>not be</b> that the managers <b>not be given</b>

subject and verb (*whether **they be***) are inverted (*be they*) when *whether* is omitted. The present subjunctive may also be used after *would rather* (*I'd rather it **be** you*) and *high time* (*It's high time they **be told***).

A common type of present subjunctive in American English is the mandative subjunctive. In both formal and informal contexts, Americans use the present subjunctive in sentences that express a demand, recommendation,

## Mandative Subjunctive in Technical Writing

proposal, resolution, or requirement. They use it in at least three sentence patterns corresponding to three classes of triggers: verbs, adjectives, and nouns.

- Noun or Pronoun + **Verb** + *That*-Clause (e.g., *The policy requires that each worker wear [not the indicative wears] a mask*)
- *It* + Verb + **Adjective** + *That*-Clause (e.g., *It is crucial that all parties be [not the indicative are] present at the hearing*)
- **Noun** + Verb + *That*-Clause (e.g., *The request was that each person be included [not the indicative is included] in the final count*)

That there are three classes of triggers is well established in the literature (Quirk, Greenbaum, Leech, & Svartvik, 1985; Huddleston & Pullum, 2002; Waller, 2017).

The main clause in one of these sentences always includes either a *suasive* verb (i.e., a verb expressing a desire to effect a change) or a related adjective or noun that triggers the subjunctive in the following *that*-clause—e.g., *The FDA **ordered** [suasive verb] that the statement **be added** [mandative subjunctive] to the warning label*. A writer of British English would be far more likely to use *should be added* in this context than would a writer of American English (Algeo, 2006; Leech, Hundt, Mair, & Smith, 2009).

In Table 2, we present examples of the correct use of the mandative subjunctive in all three clausal patterns. We took the sentences from professional documents ranging from government web pages to meeting minutes to technical reports. In each example, we have bolded and annotated keywords.

In mandative *that*-clauses, which are the focus of our study, a writer typically has three options for a verb: present subjunctive, modal *should*, or present indicative. The present subjunctive (the so-called mandative subjunctive) is said to be characteristic of American English, whereas a verb phrase containing *should* (the so-called mandative *should*) is said to be characteristic of British English. Although the present indicative is also an option for mandative *that*-clauses,

a prescriptive grammarian would regard it as a mistake, yet the mandative indicative is found in both American and British English, though apparently with greater acceptability in the latter.<sup>3</sup>

Except for the mandative *should*, modals are often out of place in mandative *that*-clauses. The use of *must* in a sentence such as “I require/request/recommend that you must finish the job” is either redundant or contradictory. The use of *can*, *may*, or *might* in the same sentence would be confusing—e.g., “I require that you might finish the job.” A sentence such as “You must finish the job” may express a mandate, but it is not a mandative construction because it lacks the characteristic syntax and trigger word such as *require* or *imperative*.<sup>4</sup> A sentence such as “It is imperative (for you) to finish the job” is a mandative construction with an infinitive, but it does not contain a *that*-clauses and therefore falls outside of the scope of our study. Nevertheless, such constructions are sometimes stylistically preferable to mandative *that*-clauses. For example, “I asked him to leave” is usually preferable to “I asked that he leave,” but “We request him to leave” is not preferable to “We request that he leave,” and “I insisted him to leave” is not an acceptable alternative to “I insisted he leave.”

In Table 3, we present examples of potentially ambiguous mandative *that*-clauses in technical writing, and we explain how they might be edited for stylistic clarity. In Table 4 and Appendix B, we present examples of mood shifting among mandative *that*-clauses and explain how those clauses might be edited for stylistic consistency.

### THE MANDATIVE SUBJUNCTIVE IN TECHNICAL COMMUNICATION TEXTBOOKS AND HANDBOOKS

A few technical communication textbooks discuss the mandative subjunctive as part of a larger discussion of verb mood. For example, Burnett (2005, p. 246) devotes a full page to verb mood. She gives five

3 “Broadly speaking, there are two types of grammarians: prescriptivists and descriptivists. A prescriptivist, a grammarian who has an agenda and takes a hard line on rules, is far more likely to find errors in tense and aspect [and mood] than a descriptivist, a grammarian who is mainly interested in how people use language and is tolerant of—and even pleased by—variance” (Cunningham, Malone, & Rothschild, 2019, p. 328).

4 It is an etymological fallacy to assume that a mandative *that*-clause expresses a mandate. Sometimes mandative *that*-clauses express mandates relatively directly (e.g., *I insist you **stay***) or indirectly (e.g., *He insisted she **stay***), but other times they do not express “mandates” at all (e.g., *I’d prefer she **go** with you if you don’t mind*). Most of the time, they express indirect directives: “Go with me” becomes “I’d prefer she go with me” or “They’re insisting she go with me.”

Table 2. Examples of sentences with the mandative subjunctive

Pattern	Example	Comment
Noun or Pronoun + <b>Trigger Verb</b> + <i>That</i> -Clause (or simply Trigger Verb + <i>That</i> -Clause)	"CAs <b>insist [verb as trigger]</b> that site software <b>be [subjunctive]</b> compliant with the CA software" (US Department of Housing, 2004, p. 10-14).	The trigger verb ( <i>insist</i> ) is indicative, but <i>be</i> is subjunctive. Insisting that the software <i>be</i> compliant is not the same as insisting that it <i>is</i> compliant. In this case, the subjunctive form is essential to the sentence's meaning. Some other trigger verbs are <i>recommend</i> , <i>request</i> , <i>urge</i> , <i>propose</i> , <i>prefer</i> , <i>suggest</i> , <i>ask</i> , <i>specify</i> , and <i>stipulate</i> .
	" <b>Demand [verb as trigger]</b> that remarks not <b>be edited [subjunctive]</b> " (US Department of Health, 2014, p. 11).	The trigger verb ( <i>demand</i> ) is part of an active-voice clause, whereas the target verb phrase ( <i>be edited</i> ) is part of a passive-voice clause. In mandative <i>that</i> -clauses, the word <i>not</i> comes before the verb ( <i>not be edited</i> vs. <i>is not edited</i> ).
<i>It</i> + Verb + <b>Trigger Adjective</b> + <i>That</i> -Clause	"Of course, it remains <b>vital [adjective as trigger]</b> that the evaluator <b>be qualified [subjunctive]</b> and <b>have [subjunctive]</b> no current or pending financial or organizational conflicts of interest" (Hopkins, 1999, p. 2).	In this sentence, <i>remains</i> is a copular (or linking) verb. The trigger adjective ( <i>vital</i> ) belongs to a semantic cluster that also includes <i>mandatory</i> , <i>adamant</i> , <i>imperative</i> , <i>essential</i> , <i>necessary</i> , <i>important</i> , <i>desirable</i> , <i>preferable</i> , <i>crucial</i> , and <i>obligatory</i> .
	"It is not <b>necessary [adjective as trigger]</b> that the defendant <b>have had [subjunctive]</b> actual physical control if the defendant at all relevant times had a duty to maintain or supervise the instrumentality in question" (Supreme, 2019, p. 130).	On rare occasions, the verb phrase in the <i>that</i> -clause may have the form of the present perfect ( <i>have had</i> , <i>have completed</i> , <i>have been undertaken</i> ) rather than the simple present ( <i>have</i> , <i>complete</i> , and <i>be undertaken</i> ).
	"It is <b>imperative [adjective as trigger]</b> that Donald Trump clearly <b>state [subjunctive]</b> that he will accept the results of the election when complete" (Corker, 2016).	This sentence was tweeted by Senator Bob Corker. Professor Russell Hirst (2016) asked his technical editing students how the meaning of the sentence would have changed if Corker had used "states" instead of "state."
<b>Trigger Noun</b> + Verb + <i>That</i> -Clause (or Trigger Noun + <i>That</i> -Clause)	" <b>The only requirement [noun as trigger]</b> <i>is that they each be uniquely named [subjunctive]</i> so one file does not overlay another" (Federal, 2019).	The trigger noun ( <i>requirement</i> ) is the subject of the sentence, and the <i>that</i> -clause is its complement. The mandative clause is passive.
	"How should a CRA respond to a <b>request [noun as trigger]</b> that it <b>correct [subjunctive]</b> information in a background check?" (American, 2013, p. 7).	Other trigger nouns include <i>demand</i> , <i>suggestion</i> , <i>preference</i> , <i>arrangement</i> , <i>stipulation</i> , <i>recommendation</i> , <i>desire</i> , <i>necessity</i> , and <i>obligation</i> . Some of these words act as stronger triggers than others.

## Mandative Subjunctive in Technical Writing

Table 3. Using the mandative subjunctive to increase clarity

Document	Passage	Comment
Instructions for installing a thermal cut-off (TCO) switch on a frozen beverage dispenser (6 pages)	NOTE: The following instructions outline the procedure to install the TCO kit on the refrigeration system of the Viper dispenser. It is <b>necessary</b> that the TCO <b>is attached</b> to the evaporator outlet tubing using thermal grease to obtain the best performance out of the Viper unit. Installation Instructions: 1. Disconnect electrical power from the dispenser. 2. Remove side panels from the unit. 3. Locate the faulty sensor. 4. Remove the black duct tape and insulation tubing. 5. Remove the faulty sensor and unplug it from the wire harness. 6. Refer to the following photos to install the new sensor into the unit. 7. Install the side panels and restore electrical power to the unit. 8. Check for proper operation. (Cornelius, 2014, p. 1)	Is the writer describing how the TCO is already attached or directing the user to attach it? Not until p. 3 does it become clear that the user must use grease to apply the “thermal mastic to the copper face.” Changing “is attached” to “be attached” on p. 1 would eliminate the ambiguity.
A web page giving advice on how to select a video conferencing server (26 paragraphs)	<b>Security</b> Video conferencing is often used to conduct important business negotiations, therefore ensuring a high level of security is extremely important. By the way, due to security concerns, customers are in no hurry to use cloud services, preferring to have a VKS server completely at their disposal. It is <b>desirable</b> that such a server <b>has</b> a built-in firewall, and the procedures for connecting to the conference <b>provide</b> reliable authorization algorithms. (“How to Choose,” 2017, para. 24)	Are VKS servers desirable because they have built-in firewalls, or is a built-in firewall something the user is supposed to look for in a good VKS server? The larger context suggests the latter interpretation; therefore, changing the indicative “has” to the subjunctive “have” would increase clarity.
An article in a scholarly journal (15 pages)	Apparently both sides of the family in this particular circumstance <b>prefer</b> that the children <b>are placed</b> in the maternal family’s care, yet neither of them wants to take the first step in the transfer of care for the fear of social criticism due to the violation of the norms of patrilocality and patrilineality. (Hoang, Lam, Yeoh, & Graham, 2015, p. 270).	The first half of this sentence seems to say that the children are already in the care of the mother’s family, but the second half of the sentence reveals that the transfer of care has not yet occurred. To make this sentence easier to understand, we would change “are placed” to “be placed.”
Installation instructions for organic blocks used in wall designs (3 pages)	Substrate: Make sure substrate is clean and free of debris. Make sure substrate is nonabsorbent. If you have an absorbent substrate, it is <b>required</b> that it <b>is sealed</b> and/or <b>primed</b> to enable a solid bond with the selected adhesive. Poor adhesion of the cork to substrate chosen is not a product failure. (Sustainable Materials, 2019, p. 2)	The third sentence says that, if your absorbent substrate is not already sealed or primed, you cannot use it. It does not explicitly direct you to seal or prime the substrate. Changing “is sealed” to “be sealed” would make it clear that you are being directed to do something. Of course, there are other ways to communicate the same message—for example, “If you have an absorbent substrate that has not been sealed or primed, you must seal and prime it first ...” (with “must” replacing “required”).



Table 4. Using the mandative subjunctive to increase consistency

Document	Comment
Operating instructions for a hot food bar (24 pages)	This procedural document includes eight mandative <i>that</i> -clauses: six with <i>recommend</i> or <i>recommended</i> , one with <i>preferred</i> , and one with <i>important</i> . Seven of the clauses are affirmative and use subjunctive verb forms; one is negative and uses an indicative verb form. For stylistic consistency, we would change the sole mandative indicative form to subjunctive: "If the food bar is fitted with rear sliding glass doors, it is <b>recommended</b> that they <b>are not [not be]</b> fully closed during operation" (Roband, 2016, p. 4). The writer used the indicative in this sentence probably because he or she did not know how to negate a subjunctive verb phrase. Negating it requires a syntactic inversion from "are not closed" to "not be closed."
Instructions for installing tankless water heaters (11 pages)	This procedural document has sixteen mandative <i>that</i> -clauses: eleven with <i>recommend</i> , two with <i>require(s)</i> , and three with <i>important</i> . Nine of these clauses use subjunctive forms, one uses an indicative form, and six use non-distinct forms (e.g., "that you <b>read</b> " and "that all members of the household <b>read</b> "). Non-distinct forms "are more likely to be covert subjunctives than covert indicatives" (Berg, Zingler, & Lohmann, 2020, p. 14). For consistency's sake, we would convert the one indicative form to a subjunctive form: "We highly recommend that this <b>is [be] done</b> in conjunction with the homeowner" (EcoSmart, 2014, p. 8).
A laboratory procedure manual (19 pages)	The following sentence from a lab manual includes two mandative subjunctive clauses and two mandative indicative clauses: <p>"Analytical Specificity: This is a highly specific method that <b>requires</b> of each analyte detected: 1) that it <b>be</b> at a specific retention time; 2) that it <b>has</b> two parent ions at specific masses; 3) that it <b>has</b> two specific daughter ions formed from each of the two two-parent ions at specific masses; and 4) the ion ratios of the two daughter ions <b>be</b> within a predetermined range" (CDC, 2002, p. 15).</p> <p>The writer used a subjunctive form whenever the verb was <i>be</i> and an indicative form whenever the verb was <i>has</i>. For stylistic consistency, we would change "has" to "have" in both places, and we would add "that" after "4)."</p>
A public letter from the manager of a water utility company to the members of a committee within the company (9 pages)	The following sentence contains five mandative <i>that</i> -clauses (four indicative and one subjunctive): <p>"AMWA <b>requests</b> [trigger 1] that any federally imposed water shutoff moratorium <b>includes</b> the following <b>conditions</b> [trigger 2]:</p> <ol style="list-style-type: none"> <li>1. That it <b>coincides</b> with the COVID-19 public health emergency period only</li> <li>2. That it <b>allows</b> for continued maintenance and repair activities (i.e. these sometimes involve temporary water shut off)</li> <li>3. That it <b>distinguishes</b> between service disconnections and reconnections (i.e. avoid mandate which requires water systems to complete all reconnections within a defined period)</li> <li>4. That it <b>be tied</b> to meaningful federal rate assistance for low-income customers" (Cole, 2020, p. 6)</li> </ol> <p>In this long sentence, the quickest edit for consistency would be to change <i>be tied</i> to <i>is tied</i>, but the better edit would be to reinforce the meaning of "not yet actualized" by changing the four active indicative forms to active subjunctive forms (e.g., <i>coincides</i> to <i>coincide</i>).</p>
An internal technical report of a government agency (272 pages)	See Appendix B.

## Mandative Subjunctive in Technical Writing

examples of subjunctive-mood sentences, of which four feature the *were*-subjunctive and one features the far more common mandative subjunctive: “When children are hospitalized, we recommend that parents **be** with them.” She seems to suggest that this form of the subjunctive is used only for making recommendations. She claims that the subjunctive mood in general is “useful in correspondence and reports” but not in “process explanations” and “directions.” While this may be true of the *were*-subjunctive, it is not true of the mandative subjunctive, which is useful in both process explanations and directions (as we explain below).

Gong and Dragga (1995) devote nearly two pages to verb mood, including the subjunctive. They note that English still has two main types of subjunctive: “the *that* subjunctive” and “the *were* subjunctive” (p. 694). The former appears to be their name for the mandative subjunctive: “I recommend that he **be** fired” and “She asked that he **come** to visit.” Although a subjunctive *that*-clause does not have to be mandative (cf. *Suppose that he were here now*), nor does the word *that* have to be explicit in such a clause (cf. *They insisted she leave*), nevertheless the name “*that* subjunctive” has the advantage of being jargon free and easy to understand for the undergraduate readers of the textbook. Gong and Dragga (1995) also mention a third type: the formulaic subjunctive (which they call “familiar expressions”).

In their technical editing textbook, Cunningham, Malone, and Rothschild (2019) provide an extended discussion of both the *were*-subjunctive and the mandative subjunctive. They include example sentences and exercises as well as a conjugation table showing the subjunctive forms of three verbs, one regular and two irregular, including *be*. However, their discussion in general and the conjugation tables in particular are rooted in traditional grammar rather than contemporary linguistics.

Most technical communication textbooks use the mandative subjunctive in examples of memos, reports, proposals, etc., but offer no explanation of it. For example, in a section titled “Focusing Sentences on Action,” Anderson (2007, p. 265) revises the sentence “I would like to make a recommendation that the department **hire** two additional programmers” to read

“I recommend that the department **hire** two additional programmers,” but he is concerned with reducing wordiness, not using the subjunctive mood. He does not explain why, in both sentences, the mandative subjunctive *hire* is used instead of the indicative *hires*. Anderson (2007) uses the mandative subjunctive in other examples on pages 168, 260, 316, and 549 and in scenarios on pages 58, 89, 94, 130, 443, and 595.

Markel (2010) explains the *were*-subjunctive and gives an example of it (p. 721), but he does not explain the far more common mandative subjunctive, yet the mandative subjunctive is used in some of his examples of technical writing:

- “advised that the company **initiate**” (p. 214)
- “recommend that more work . . . **be done**” (p. 222)
- “requires that the corresponding block lock bit **be cleared**” (p. 293)
- “recommend . . . that the pump **be modified**” and “that the pump **be reinspected**” (p. 464)
- “recommended Geo-Hydro Corporation **use**” (p. 498)
- “recommend that the company **purchase**” and “that . . . the company **decide**” (p. 517)
- “recommend that the gym **try . . . and then** revisit” (p. 519)
- “required that safety glasses **be worn**” (p. 523)

Without explanation, undergraduate readers are not likely to understand why the base form of the verb is being used in these passages.<sup>5</sup>

Pfeiffer and Adkins (2010) make no mention of the mandative subjunctive, but they use it in technical writing examples on pages 5, 11, 70, 230, 240, 242, 279, 290, 468, 546, and 641. The use of the mandative subjunctive in all these examples speaks to its ubiquitous presence and usefulness in technical writing.

Most technical communication handbooks explain and illustrate the mandative subjunctive in brief entries on verb mood, but they do not use the term *mandative*. Gurak and Hocks (2009, p. 492) include a page about verb mood, including the subjunctive. Two of their three examples of the subjunctive are sentences with *if*-clauses: a past subjunctive (*were*) and a present subjunctive (*be*). The third sentence is an example of the mandative subjunctive: “It is mandatory that he *dress* appropriately.” The authors do not explain why *dress* is

5 Although Markel’s textbook was available in a 13<sup>th</sup> edition (Markel & Selber, 2021) at the time of our writing, we used the 9<sup>th</sup> edition (Markel, 2010) because we had access to a searchable digital scan of that edition via archive.org.

grammatically correct in this sentence or whether using *dresses* would affect the meaning of the sentence. In our view, using *dresses* in this sentence would mean that he already dresses appropriately because it is required, whereas using *dress* would mean that he has not yet met the requirement that is being imposed.

In the 2<sup>nd</sup> edition of their handbook, Hargis and her IBM colleagues (Hargis et al., 2004, p. 199) align the indicative mood with the two DITA types—concept and reference—and the imperative mood with a third DITA type—task. They find no place in this scheme for the subjunctive mood, which they claim “is rarely appropriate” because “[a] subjunctive statement can confuse users and can be difficult to translate into languages that do not have the equivalent verb quality.” The IBM authors (Carey, Lanvi, & Longo, 2014) omit this discussion of verb moods from the 3<sup>rd</sup> edition of their handbook.

Although the association of the indicative and imperative moods with DITA types is clever and intriguing, Hargis et al. (2004) provide no evidence that the mandative subjunctive is “rarely appropriate” in a DITA concept, reference, or task component. In practice, writers use both the imperative and the mandative subjunctive to issue directives: the former directly, the latter indirectly. The directive “**Attend [imperative]** the meeting if you are a new employee” may be rephrased as “We ask that every new employee **attend [mandative subjunctive]** the meeting” or reported as “The policy requires that every new employee **attend [mandative subjunctive]** the meeting.” Therefore, the mandative subjunctive seems particularly relevant to procedural (or task-based) writing. Instructions often include mandative subjunctive sentences such as “We recommend that columns **be installed** in sequential order” (Rockwell Automation, 2019, p. 17) and “It is recommended that the water **be allowed** to cool before draining the tank” (Roband, 2016, p. 9).

A sentence with a mandative *that*-clause might be used in a DITA task. For example, a task titled “Shortening the control cord on a blind” might contain the following step:

<step>

<cmd>Adjust the cord to the desired height.  
</cmd>

<info>If a child under 3 years old is living in the home, it is imperative that the cord **be** no more than 40 percent of the height of the blind. Children have been strangled by longer cords.</info>

</step>

In this case, the shift in grammatical mood changes the writer’s tone abruptly, emphasizing the gravity of the directive. It is an indirect directive—that is, a directive from an industry standard that the writer is passing along to the user.

Hargis et al. (2004) do not substantiate their claim that the subjunctive “can confuse users,” but we know that an indicative in a mandative *that*-clause can sometimes confuse readers. The non-mandative clause “It is only fitting that they **are allowed** to attend the meeting” (they are already allowed) has a different meaning from the mandative clause “It is only fitting that they **be allowed** to attend the meeting” (they are not yet allowed). Using the former in place of the latter might confuse some readers even if the context provides clarifying cues. For an American audience, even using “should” in a mandative clause might create ambiguity by interjecting the notion of moral obligation or duty: “It was agreed that negotiations **should be suspended**” (Was there merely agreement that it ought to be done, or was there agreement to do it?). An American audience may be less adept than a British audience at distinguishing *should* in the sense of obligation (the “deontic” *should*) from the so-called mandative (or putative or specialized) *should* (Algeo, 2006, p. 602; Waller, 2017, pp. 54–55).

Alred, Bursaw, and Oliu (2012, pp. 354–355) discuss the *were*-subjunctive and the mandative subjunctive in an entry about mood. In an “ESL Tips” box, they write, “In written and especially spoken English, the tendency increasingly is to use the indicative mood where the subjunctive traditionally has been used.” They describe the sentence “I requested that she **shows up** on time” as a “contemporary (informal)” version of the traditional (formal) sentence “I requested that she **show up** on time.” They give the following advice: “In professional writing, it is better to use the more traditional expressions.” We offer three observations about their example:

## Mandative Subjunctive in Technical Writing

1. Both *shows up* and *show up* will convey the same mandative meaning (not yet actualized), but *show up* will express that meaning more directly and clearly.
2. Both *shows up* and *show up* are informal by comparison to *arrive*. The suggestion that there is a correlation between the indicative-subjunctive distinction in mandative clauses and an informal-formal register in style is worthy of study, but the mandative subjunctive is not associated exclusively with a formal style. Examples can readily be found in impromptu speech: “It’s important that she **listen** to us” or “I’d rather he **not say** anything” (in which *rather* seems to have the same meaning as the mandative trigger *prefer*).
3. In most contexts, “I asked her to show up on time” would be stylistically preferable to “I requested that she show up on time”—if, indeed, the request was made directly to her and not indirectly by way of someone else.

Claiming that “careful writers” should pay attention to the subjunctive, Einsohn and Schwartz (2019, pp. 357–360) offer many examples of the present and past subjunctive. Although they never use the term *mandative*, they show their awareness of the mandative subjunctive when they write, “The subjunctive is required in *that* clauses following verbs of command, demand, suggestion, recommendation, wish, request, or necessity” (p. 358). To illustrate this rule, they give six examples of the mandative subjunctive and one example of the *were*-subjunctive after *wish*. Their inclusion of a *were*-subjunctive example suggests that their understanding of the mandative subjunctive is imperfect. They contrast the meanings of “It is important that the instructions **be printed** in bold type” (necessity) and “It is important that the instructions **are printed** in bold type” (fact), but they do not acknowledge the ambiguity created by using “are printed” to mean “be printed.” Writers routinely use indicative forms in mandative clauses at the expense of clarity and consistency.

Moreover, Einsohn and Schwartz (2019) do not consider other stylistic alternatives, such as “It is important to print the instructions in bold type.” This revision might seem like a viable option, but it actually alters the intended meaning slightly. The active-voice infinitive “to print” does not have an explicit subject; therefore, the reader will mentally insert *you* while

reading it (“important for you to print”). By contrast, the original sentence uses passive voice (*be printed*) and does not say that the reader is supposed to print the instructions in bold. In fact, the meaning seems to be that someone else is supposed to do it (e.g., a printer). As a writer or editor, if you are looking for a way to avoid the mandative subjunctive entirely, you should keep in mind that each stylistic variation usually causes a shift in meaning, however subtle.

The authors of these handbooks considered the mandative subjunctive important enough to mention and illustrate, but most of them did not provide enough information for their audience to recognize it or use it correctly. For example, none of them discuss how to negate a subjunctive form: *that they do not have* becomes *that they not have* through the dropping of *do*-support and *that it is not* becomes *that it not be* through a syntactic inversion. Technical and scientific editors such as Underwood (2011) and Smith (2018) have argued that the mandative subjunctive is alive and well and that editors need to understand it. As we have been arguing in this article, using the mandative subjunctive prescriptively serves the goals of stylistic clarity and consistency as well as semantic accuracy. For an American audience, it is almost always a better stylistic choice than the mandative indicative.

## METHODS

To investigate our students’ use of the mandative subjunctive, we administered an elicitation test in eight sections of the following courses at Missouri University of Science and Technology (Missouri S&T):

- One section of Composition I
- Four sections of Composition II
- Three sections of Technical Writing

We chose the students in these courses to be our subjects because they were primarily STEM majors taking writing courses. STEM majors usually become engineers and scientists who write in the workplace, and their writing is likely to be edited by peers, managers, or professional editors. These subjects were also convenient because we had ready access to them.

We received Institutional Review Board approval for our study in March 2016, conducted a pilot study in February 2017, and collected the data for the main study in March 2017. All tests were administered by co-author Roberson.

## Development and Use of the Data Collection Instrument

Researchers studying the mandative subjunctive usually employ one of two research methods: either an experiment involving elicitation (e.g., Nichols, 1987; Peters, 1998; Whatley, 2014) or a systematic analysis of one or more corpora (e.g., Övergaard, 1995; Serpollet, 2001; Waller, 2017). Elicitation experiments generate artificial rather than natural data, but they offer affordances that a large textual corpus does not. For example, they enable a researcher to study a specific language behavior of a group of subjects at one point in time and to ensure that written responses are not edited by a third party. An elicitation test may be based on judgment (in which subjects express an opinion or preference) or performance (in which subjects compose or revise text) (Meyer & Nelson, 2006, pp. 99–100).

We used a performance elicitation test in our pilot study because we were studying the performance of a specific group of STEM majors and wanted to know how they would respond to triggers for the mandative subjunctive. Thus, for the pilot study, we developed our first research question: How often will the students use the mandative subjunctive in test sentences containing mandative trigger words? The elicitation test for the pilot study consisted of 9 prompts, such as the following:

1. Mine workers must follow safety protocol.  
State regulations mandate that each mine worker\_\_\_\_\_.
2. A healthcare provider should wear a face mask when attending to patients with tuberculosis.  
Safety necessitates that a healthcare provider\_\_\_\_\_.

After analyzing the results of the pilot test, we were concerned that our prompts (e.g., “Mine workers must follow safety protocol”) might have influenced the students’ choices of verb phrases in the *that*-clauses (e.g., “State regulations mandate that each mine worker [must follow safety protocol]”). Also, we decided that a second research question was necessary: Were the students more likely to use the mandative subjunctive in composing or editing? Thus, we revised the pilot study test to create two versions of the test:

1. A complete-the-sentence version requiring the students to compose a complete predicate for a

*that*-clause (e.g., “1. Safety demands that the driver \_\_\_\_\_”).

2. A fill-in-the-blank version requiring the students to supply a simple predicate—i.e., a missing verb phrase—in an otherwise complete *that*-clause (e.g., “10. The new policy mandates that every public meeting \_\_\_\_\_transparent”).

Each of the two test versions included twelve sentence prompts: four with trigger verbs, four with trigger adjectives, and four with trigger nouns.

In the main study, we administered the complete-the-sentence version in four classes and the fill-in-the-blank version in four classes. Both versions were prefaced with an informed consent statement and the following instructions: “Below are sentences similar to those you might find in an instruction manual, employee handbook, and so forth. Please complete each sentence in a manner that makes sense to you.”

## Study Participants

As previously mentioned, the 134 study participants were all Missouri S&T students who completed the test in eight sections of three courses during the Spring 2017 semester. We used the class rosters provided by the university to identify students’ class levels and majors, but we could not distinguish test participants from nonparticipants in any class. Thus, in the last column of Table 5, the first number represents the number of students enrolled in the class, while the second number (in parentheses) represents the number of students who participated in the test. Students had the option to opt out of the test, and a few did so. Other students were absent on the day the test was administered.

As shown in Table 6, our sample included 22 distinct majors as well as five types of double majors. We counted the double majors separately from the single majors. A total of 125 out of 134 students (93 percent) were STEM majors.

## Coding of Collected Data

Influenced by previous researchers (e.g., Övergaard, 1995; Whatley, 2014; Waller, 2017), we developed the following codes for our study: *I* for “indicative,” *S* for “subjunctive,” *M* for “modal,” *O* for “other,” and *X* for “left blank.” One of us, Malone, coded all the responses on the pilot test, and we hired a second coder,



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Table 5. Participants by class level

Test Version	Course	Freshman	Sophomore	Junior	Senior	Graduate	Not Given	
<b>Complete the Sentence</b>	Comp II (Test 2)	5	3	2	2	0	1	13 (12)
	Comp II (Test 4)	9	5	3	0	0	0	17 (15)
	Tech Writing (Test 6)	0	0	7	9	0	0	16 (15)
	Tech Writing (Test 7)	0	0	8	9	1	0	18 (18)
<b>Fill in the Blank</b>	Comp II (Test 1)	2	7	2	4	0	0	15 (15)
	Comp II (Test 3)	6	6	3	2	0	0	17 (16)
	Tech Writing (Test 5)	0	0	8	10	1	0	19 (19)
	Comp I (Test 8)	12	6	0	1	0	0	19 (19)
		34	27	33	37	2	1	<b>Totals</b>

Emily Seals, to do the same.<sup>6</sup> After we had discussed the few responses on the pilot test that the two coders had disagreed about, we made changes to the coding scheme. The final version of the coding scheme is shown in Table 7.

Working independently on the main test, the two coders gave the same codes to 1524 out of 1548 responses, for a simple agreement of 98.5 percent. The 24 disagreements had various causes. For example, on several responses, one or the other coder made a careless error, treating an obvious indicative verb form as subjunctive or vice versa. On several responses, one student wrote “[verb]s” rather than specifying the verb; one coder treated this as *I* while the other treated it as *O*. On a few responses, a student’s handwriting was illegible (= *O*) to one coder but legible to the other (*I* or *S*). One coder treated “miss read” as *O* while the other coder treated it as *S*. Each of these disagreements was later re-analyzed and resolved.

As stated previously, the two coders disagreed on 24 of the 1548 responses, and we evaluated and resolved each of those 24 disagreements. Our resolutions are reflected in the numbers we present in the results section.

## RESULTS

Sixty students completed all or some of the twelve sentence prompts on the complete-the-sentence version of the test, for a total of 720 responses. Table 8 presents a classification of those responses according to their grammatical types (i.e., mandative variants). On sentence prompt 1, for example, 24 students out of 60 (or roughly 40 percent) used the indicative, 30 out of 60 (or roughly 50 percent) used the subjunctive, etc. We have rounded each percent to the nearest full number. Because modal verb phrases (*that it **must be**, that he **should leave**, etc.*) are sometimes classified as indicative, we remind the reader that we use the term *indicative* throughout this article to mean only non-modal indicatives (*that it **is**, that he **leaves**, that they **not be**, etc.*). We bolded the highest percent for each sentence prompt, and we included one illustrative response in each cell.

<sup>6</sup> As a reminder, “we” refers to the authors, Malone and Roberson.

**Table 6. Participants by academic major**

Major	Number of Students
Computer Engineering	21
Computer Science	18
Mechanical Engineering	15
Electrical Engineering	11
Engineering Management	7
Nuclear Engineering	6
Aerospace Engineering	5
Chemical Engineering	5
Geological Engineering	5
Biological Science	4
Metallurgical Engineering	4
Chemistry	3
Petroleum Engineering	3
Civil Engineering	3
Geology and Geophysics	3
Technical Communication	3
Undeclared	3
Physics	2
Information Science and Technology	2
Computer Engineering and Electrical Engineering (double major)	2
Architectural Engineering	1
Ceramics Engineering	1
Economics	1
Psychology	1
Aerospace Engineering and Computer Science (double major)	1
Biological Science and Psychology (double major)	1
Computer Science and Computer Engineering (double major)	1
Mechanical Engineering and Physics (double major)	1
Not Given	1
<b>TOTAL</b>	<b>134</b>

**Table 7. Explanation of codes used in this study**

Code	Form	Examples from Responses
I	indicative, present, singular	"submits," "is provided," "does not break," "has completed," "reviews and understands," "has to wear"
S	subjunctive, present, singular	"submit," "be locked," "not break," "have completed," "read and follow"
M	modal	"should be," "must complete," "couldn't move," "can go," "will alternate" (but not verb phrases containing <i>has to</i> , <i>is to</i> , etc.)
0	other	
	infinitive	"to report," "to be made," "to be"
	past tense	"completed," "broke," "had to complete," "had gone," "was to complete," "was finished"
	noun or pronoun without verb	"staff member," "each employee," "plenty of"
	adjective or adverb	"due today," "securely"
	prepositional phrase	"of what to wear"
	plural form	"are," "have to keep"
	two ambiguous verbs	"have, are" ("Are" is plural indicative, but is "have" singular subjunctive or plural indicative?)
	sentence	Prompt: "The foreman asks that the operator" Response: "Do you know how to work this?"
	illegible	
X	left blank; did not respond	

## Mandative Subjunctive in Technical Writing

**Table 8. Complete-the-sentence version of the test (responses by sentence prompt)**

Sentence Prompt	Indicative (I)	Subjunctive (S)	Modal (M)	Other (O)	Left Blank (X)
1. Safety demands that the driver ...	24 (40%) ... wears a seat belt.	30 (50%) ... keep their eyes on the road.	6 (10%) ... should always be aware of his/her surroundings.	0	0
2. It is imperative that he ...	34 (57%) ... pulls the brake when parking.	19 (32%) ... submit his application on time.	1 (2%) ... must stop.	1 (2%) ... completed the assignment early.	5 (8%)
3. The stipulation was that each player ...	14 (23%) ... follows the rules.	11 (18%) ... play by the rules.	17 (28%) ... couldn't move.	16 (27%) ... wore cleats.	2 (3%)
4. I suggest that payment ...	9 (15%) ... is given in full.	38 (63%) ... be completed as soon as possible.	8 (13%) ... would be done monthly.	3 (5%) ... to be made.	2 (3%)
5. It will be important that the circuit breaker ...	43 (72%) ... is flashing the green LED light.	11 (18%) ... be turned on to allow use of electric devices.	1 (2%) ... should be watered [sic] daily.	1 (2%) ... worked properly.	4 (7%)
6. The manual's recommendation is that the engine ...	25 (42%) ... is checked at least once a month.	16 (27%) ... remain in the off position.	14 (23%) ... should be warm for the test.	1 (2%) ... in [sic] in the vehicle.	4 (7%)
7. The company insists that every new employee ...	22 (37%) ... meets with his/her peers.	26 (43%) ... read the manual.	11 (18%) ... should fill out a FAFSA.	0	1 (2%)
8. It is necessary that the device ...	32 (53%) ... stays in operation until the task is completed.	21 (35%) ... be turned on.	3 (5%) ... must be charged.	0	4 (7%)
9. The procedure is that each bolt ...	28 (47%) ... is to be tightened in order.	10 (17%) ... be taken off one at a time.	14 (23%) ... should be tightened.	1 (2%) ... well be screwed 4 times.	7 (12%)
10. The foreman asks that the operator ...	9 (15%) ... waits until everyone is seated.	24 (40%) ... watch for any overloading of the machine.	1 (2%) ... may stop slacking on the job, under threat.	18 (30%) ... to be cautious.	8 (13%)
11. It is requested that the belt ...	23 (38%) ... is snug around the wheels.	26 (43%) ... be replaced every five days.	5 (8%) ... should be 10 ft long.	1 (2%) ... changed every 2 years.	5 (8%)
12. The requirement was that the night manager ...	14 (23%) ... works for less than 8 hours.	17 (28%) ... review the reports of the day shift.	12 (20%) ... must not sleep on the job.	10 (6%) didn't fall asleep.	7 (12%)
TOTAL (720)	277	249	93	52	49

Sixty-nine students completed all or some of the twelve sentence prompts on the fill-in-the-blank version of the test, for a total of 828 responses. Table 9 presents a classification of those responses according to their grammatical types. The ellipsis in each prompt

(stub column) represents the line on which the student wrote the verb form. We have rounded each percent to the nearest full number, bolded the highest percent for each sentence, and provided an illustrative response in each cell.

**Table 9. Fill-in-the-blank version of the test (responses by sentence prompt)**

Sentence Prompt	Indicative (I)	Subjunctive (S)	Modal (M)	Other (O)	Left Blank (X)
1. Safety necessitates that a healthcare provider ... face masks.	37 ( <b>54%</b> ) supplies	19 (28%) wear	8 (12%) should inspect	4 (6%) plenty of	1 (1%)
2. It is important that each door ... for security reasons.	48 ( <b>70%</b> ) opens, closes, and locks	19 (28%) remain closed and locked	2 (3%) should be locked	0	0
3. The hospital's suggestion is that each new ... orientation.	40 ( <b>58%</b> ) person goes through	14 (20%) employee attend	2 (3%) work [sic] should attend	5 (7%) workers need	8 (12%)
4. Good practice demands that the groundskeeper ... the ground.	43 ( <b>62%</b> ) tests	19 (28%) inspect	0 (1%)	2 (3%) water+ (+ = illegible mark)	5 (7%)
5. It is crucial that the apparatus ... in place.	55 ( <b>80%</b> ) stays	10 (14%) be set	1 (1%) must be firmly attached	2 (3%) we placed	1 (1%)
6. The requirement is that each miner ... flashlights.	54 ( <b>78%</b> ) always has extra	9 (13%) safely utilize appropriately bright	5 (7%) must always carry	1 (1%) have to bring several	0
7. The department requests that the candidate ... the application by June 5.	30 (43%) completes	38 ( <b>55%</b> ) submit	1 (1%) should submit	0	0
8. It is vital that the user ... all procedures.	60 ( <b>87%</b> ) follows	8 (12%) follow	0	0	1 (1%)
9. The order was that he ... by the deadline.	20 ( <b>30%</b> ) turns the assignment in	19 (28%) comply	14 (20%) must execute Order 66	15 (22%) submitted his work	1 (1%)
10. The new policy mandates that every public meeting ... transparent.	31 ( <b>45%</b> ) is	19 (28%) be	18 (26%) must be	1 (1%) were	0
11. At this point, it is essential that the chemist ... the beaker.	55 ( <b>80%</b> ) rinses out	9 (13%) not break	1 (1%) must dispose of	3 (4%) didn't drop	1 (1%)
12. Her arrangement is that he ... two of them.	34 ( <b>49%</b> ) mentors	8 (12%) happily escort the	12 (17%) must take	6 (9%) bought	9 (13%)
TOTAL (828)	507	191	64	39	27

## Mandative Subjunctive in Technical Writing

Tables 10 and 11 present a classification of the responses by course as well as by test version. We have rounded each percent to the nearest full number and bolded the highest percent for each course. These tables show that the mandative subjunctive was dominant in two of the four classes that took the complete-the-sentence version of the test, but it was not dominant in any of the four classes that took the fill-in-the-blank version of the test. As a reminder, the complete-the-sentence version of the test required constructing a clause as a response and corresponds to composing, whereas the fill-in-the-blank version of the test required inserting a verb phrase (i.e., one or more words) as a response and corresponds to editing or revising.

### DISCUSSION

In this section, we discuss the results in light of our two research questions. In our interpretation of the results, we do not try to generalize beyond our own sample.

#### Research Question 1 (R1)

In **R1**, we asked, “How often will the students use the mandative subjunctive in test sentences containing

mandative trigger words?” Many of our students followed the grammar rule of using the present subjunctive in mandative *that*-clauses, but even more of them used the present indicative in these clauses. As shown in Tables 10 and 11, the indicative was the dominant mandative variant across all responses, being used in 784 of the 1548 responses (51 percent). This result may be significant in its own right because the students in our study were mainly users of American English; therefore, their heavy use of the mandative indicative calls into question the prevailing view that “the indicative after suasive expressions is indeed a syntactic Britishism” and “is really only an alternative in BrE” (Leech, Hundt, Mair, & Smith, 2009, pp. 54, 57).

The students used the subjunctive much more frequently than modals, including *must* and *should*. Across both versions of the test, the subjunctive variant was used in 440 responses (28 percent), while the modal variant was used in just 157 responses (10 percent). *Must* was the most popular modal, with 69 occurrences, followed by *should*, with 58. The other modals in our sample—*would*, *can*, *could*, *may*, *will*, and *shall*—had fewer than 10 occurrences each. We surmise that our students do not use modals very

**Table 10. Complete-the-sentence version of the test (responses by course)**

Course	Number of responses	Responses				
		Indicative (I)	Subjunctive (S)	Modal (M)	Other (O)	Left Blank (X)
Comp II	144	55 (38%)	61 ( <b>42%</b> )	16 (11%)	12 (8%)	0
Comp II	180	85 ( <b>47%</b> )	56 (31%)	25 (14%)	12 (7%)	2 (1%)
Tech Writing	180	49 (27%)	75 ( <b>42%</b> )	19 (11%)	7 (4%)	30 (17%)
Tech Writing	216	88 ( <b>41%</b> )	57 (26%)	33 (15%)	21 (10%)	17 (8%)
TOTAL	720	277	249	93	52	49

**Table 11. Fill-in-the-blank version of the test (responses by course)**

Course	Number of responses	Responses				
		Indicative (I)	Subjunctive (S)	Modal (M)	Other (O)	Left Blank (X)
Comp II	180	122 ( <b>68%</b> )	43 (24%)	9 (5%)	2 (1%)	4 (2%)
Comp II	192	117 ( <b>61%</b> )	53 (28%)	13 (7%)	6 (3%)	3 (2%)
Tech Writing	228	134 ( <b>59%</b> )	49 (21%)	21 (9%)	18 (8%)	6 (3%)
Comp I	228	134 ( <b>59%</b> )	46 (20%)	21 (9%)	13 (6%)	14 (6%)
TOTAL	828	507	191	64	39	27



naturally in mandative *that*-clauses. As mentioned previously, Americans do not use the mandative *should* as commonly and naturally as the British do (Algeo, 2006). Other modals occasionally work in mandative *that*-clauses, but more often they are bad fits: merely redundant rather than rhetorically emphatic (e.g., *It is necessary that you **must** go*) or contradictory or illogical (e.g., *We ask that you **must** go*). A modal may change a clause from mandative to non-mandative: *It is important that you **go** with us* (mandative) versus *It is important that you **can** go with us* (non-mandative).

On the complete-the-sentence version, the subjunctive was the dominant mandative variant used in one section of Composition II and one section of Technical Writing (see Table 10) as well as in responses to sentence prompts 1, 4, 7, 10, 11, and 12 (see Table 8)—i.e., half of the sentence prompts on that version of the test. In sentence prompt 4, “I suggest that payment . . .,” the trigger word *suggest* elicited the subjunctive in 63 percent of the responses. The other strong trigger words were *demands* (50 percent), *insists* (43 percent), *asks* (40 percent), *requested* (43 percent), and *requirement* (28 percent).

Some students used the mandative subjunctive more than other students did. As shown in Table 12, 105 out of 129 students (81 percent) used the mandative subjunctive at least once in their responses.

One student used the mandative subjunctive in responses to all twelve sentence prompts, whereas 24 students (19 percent) did not use the mandative subjunctive even once.

### Research Question 2 (R2)

In R2, we asked, “Will they use the mandative subjunctive more often in drafting/composing (i.e., generating the complete predicate of a mandative *that*-clause) or revising/editing (i.e., supplying the simple predicate in an otherwise complete *that*-clause)?” Students in our sample were far more likely to use the mandative subjunctive when they had to complete a sentence with a complete predicate than when they had to fill in a blank with a simple predicate. However, it should be noted that, on the fill-in-the-blank version of the test, students sometimes wrote more than simple predicates in the blanks; some of their responses included adverbs (e.g., *not*, *thoroughly*) and other word classes (e.g., *The requirement is that each miner **has spare batteries for** flashlights* rather than just . . . *each miner **has** flashlights*).

Although the subjunctive was the dominant mandative variant in two of the four classes taking the complete-the-sentence version of the test, the indicative was the dominant variant in all four classes taking the fill-in-the-blank version. Students in the latter group

**Table 12. Number of mandative subjunctives used per 12 responses by each student**

Number of Sentence Prompts (out of 12) Completed with the Mandative Subjunctive	Number of Students (out of 129) Who Did So	Taking the Complete-the-Sentence Version	Taking the Fill-in-the-Blank Version
12	1	1	0
11	2	2	0
10	2	0	2
9	3	3	0
8	6	4	2
7	6	2	4
6	13	8	5
5	9	4	5
4	12	7	5
3	14	8	6
2	19	8	11
1	18	8	10
0	24	6	18

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were more than two times as likely to use the indicative than the subjunctive. Of course, there are many factors that might have contributed to this tendency—the specific trigger words that were used, the semantic contexts in which they were used, the specific students who took the test, etc.—but the fill-in-the-blank format of the test seems to have been a factor.

On the fill-in-the-blank test (Table 9), the subjunctive was the dominant mandative variant on only one sentence prompt (out of 12). In sentence prompt 7, “The department requests that the candidate . . . the application by June 5,” the trigger word *requests* elicited a subjunctive verb form in 55 percent of the responses. The indicative was the dominant mandative variant on all other sentence prompts.

We speculate that students were less likely to use the mandative subjunctive when they were supplying a verb phrase because they were focusing on a narrow semantic and syntactic context and may have been concerned with choosing the correct form of the verb to create subject-verb agreement in number. By contrast, students who completed the other version of our test were focusing on a larger semantic and syntactic context, and the meaning of the whole sentence may have demanded more of their attention. They were constructing a clause with a verb phrase in it rather than inserting a verb phrase into an existing clause. They were less likely to be thinking about subject-verb agreement rules.

If our speculation is correct, students may have been more likely to use the mandative subjunctive when they were accessing grammar rules subconsciously (i.e., from their linguistic experience as communicators as well as readers) rather than consciously (i.e., from a limited repertoire of school-learned rules about verb formation and use). Meyer and Nelson (2006) call attention to this phenomenon in their critique of elicitation tests: “As a consequence, [when asked whether they prefer a singular or plural verb in a given context], many individuals might not give a natural response, but try to determine what they might have been taught in school about subject-verb agreement” (p. 100).

### CONCLUSION

Although the mandative subjunctive has received considerable attention in the published literature of

linguistics, our study is the first to examine it for an audience of professional writers and editors as well as students and teachers of technical communication. We have focused on the use of the mandative subjunctive in professional writing, especially technical writing. Our study is also the first to compare the elicited use of the mandative subjunctive under two different procedures: finishing a sentence by composing a complete predicate for a mandative *that*-clause and filling in a simple predicate (i.e., a verb phrase) in an otherwise complete mandative *that*-clause. We suggest that the former procedure is analogous to writing or composing text (i.e., performance relying mainly on a large store of subconscious grammar rules), while the latter is analogous to revising or editing text (i.e., analysis relying mainly on a small store of conscious grammar rules).

Our study has shown that both the mandative indicative and mandative subjunctive were used frequently in the responses of the university STEM majors in our sample. Thus, the results of both our elicitation experiment and our analysis of workplace documents suggest that editors are likely to encounter both mandative variants in workplace writing for the foreseeable future, and the sentences in which they are used will need to be edited competently for semantic accuracy as well as stylistic clarity and consistency.

Some words such as *insist*, *suggest*, *propose*, *fitting*, and *important* may be followed by either a mandative or non-mandative *that*-clause (Huddleston & Pullum, 2002, pp. 995–996, 999). The indicative form must be used if the clause is non-mandative (*I suggest that he **knows** the difference* = he already knows it), and the subjunctive form must be used if the clause is mandative (*I suggest that he **know** the difference* = he needs to learn it). In these cases, the writer does not have the choice of using either an indicative or subjunctive verb form. A competent writer and editor must know which one is correct.

Other words such as *demand*, *require*, *recommend*, *essential*, and *necessary* may be followed only by a mandative *that*-clause. In these cases, the writer has a choice of using either an indicative or subjunctive form to convey the mandative meaning of “not yet actualized.” Contrast “*They are recommending that everyone over 60 **gets** tested*” and “*They are recommending that everyone over 60 **get** tested*.” The reader can extract the same mandative meaning from both, but the use of a subjunctive verb form reinforces the mandative

meaning, thereby increasing clarity and reducing the interpretative burden on the reader. For this reason, in mandative clauses for American audiences, the present subjunctive is usually a better stylistic choice than either the present indicative or the modal *should*.

Like many other grammatical choices made in linguistic performance, our students' use of the mandative subjunctive may have been largely subconscious and therefore an unwitting part of their grammatical repertoires as communicators. On the fill-in-the-blank version of the test, if students' use of the subjunctive was inhibited by their conscious attempts to construct subject-verb agreement in number and person, then we have to ask the following questions:

- To what extent does a too-limited set of school-learned rules about grammar undermine effective revision and editing?
- How much grammatical awareness should professional writers and editors have?
- If they need more, how should they acquire it?

A technical writing service course is hardly the place to study grammar in depth. There are too many other things that must be covered in such a course. The mandative subjunctive might be taught in an advanced course on editing or stylistics in technical communication; barring that, it will remain one of the many language-related topics that dedicated writers and editors must study on their own, perhaps by reading articles such as this one. Technical communication handbooks can do their part by providing better explanations of the mandative subjunctive and similar grammar-related topics.

The use of the mandative subjunctive is mentioned and illustrated in some technical communication textbooks and most technical communication handbooks, and some of these sources explicitly recommend its use over other mandative variants. However, these sources generally do not provide enough information for readers to understand why the subjunctive is used in a sentence such as the following: "Tens of thousands of people rely on this aquifer for their water, and we are really concerned that it **not be contaminated** in any way and still **be** a viable drinking source for the city of Rapid City" (Project NEPA, 2019). We suspect that many seasoned technical communicators, including editors, are not fully cognizant of this grammatical construction in their reading and writing. One of our goals in this article has

been to increase awareness and understanding of the mandative subjunctive by explaining and illustrating its uses and emphasizing its relevance to technical writing.

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## APPENDIX A: A BRIEF HISTORY OF VERB MOOD IN ENGLISH GRAMMAR

Nineteenth-century grammarians recognized as many as six moods (or modes) of the English verb: indicative, imperative, subjunctive, potential, infinitive, and sometimes participle. After reducing the number of English moods to three, one early 20<sup>th</sup> century linguist famously characterized the indicative as the “fact-mood,” the imperative as the “will-mood,” and the subjunctive as the “thought-mood” (Jespersen, 1924/1965). Subsequent English grammarians usually recognized only three moods: indicative, imperative, and subjunctive.

In traditional English grammar, the prevailing view was that verbs were inflected for number, person, tense, aspect, voice, and mood. In other words, mood was one of the inflectional categories of the verb. Inflection is a change in the form of a verb to reflect a change in its function. A verb might be inflected, or marked, by adding a suffix (as when *find* becomes *finds*), making an internal change to the word (as when *swim* becomes *swam*), or using a different word (i.e., a suppletion, as when *go* becomes *went*) (Lass, 1999, pp. 137–138). A

verb such as the indicative *find* or the subjunctive *be* was said to be zero-inflected—that is, marked by what was absent (e.g., an inflectional suffix) rather than what was present (Lass, 1999, pp. 158–162).

Today most English grammarians fall into one of two groups with respect to verb mood: (1) those who view verb mood as being strictly analytic (realized through syntax and/or periphrasis) rather than synthetic (realized through morphology) (e.g., Aarts, 2012; Huddleston & Pullum, 2002; Ziegeler, 2020), and (2) those who continue to recognize mood as a relevant, albeit impoverished, inflectional category of the English verb (e.g., Collins, Borlongan, Lim, and Yao, 2014; Declerck, 2006; Depraetere and Reed, 2006; Leech, Hundt, Mair, and Smith, 2009).

For the purposes of our study, we recognize the subjunctive as a morphosyntactic mood in English. In other words, it is expressed through both morphology (verb form) and syntax (clause type). We use the terms *subjunctive*, *indicative*, and *imperative* to describe both verb forms and clause types.

## Mandative Subjunctive in Technical Writing

### APPENDIX B: INCONSISTENT USE OF THE MANDATIVE SUBJUNCTIVE

<p style="text-align: center;">RECOMMENDATIONS</p> <ol style="list-style-type: none"> <li>1. That minimal standards for authentic materials <b>be developed</b> and <b>incorporated</b> in the EDRO QA Program.</li> <li>2. That an in-house or contractual arrangement <b>be prepared</b> (for open bidding) which will specifically acquire, culture, preserve, and redistribute authentic specimens to the FDA labs, while providing stock specimens for later use as the need is indicated. This would include a bibliography with each authentic.</li> <li>3. That EDRO <b>incorporates</b> in its work plan, time for each analyst, when they begin to receive the new authentic materials, to review the material, acquire the references they consider relevant, and prepare the morphological series they need for routine MA identifications.</li> <li>4. That EDRO <b>establishes</b> the Office of Information Services ("principal coordinator") to coordinate and develop the field's information delivery program as outlined in this report.</li> <li>5. That EDRO and each office <b>establish</b> in their facility a temporary professional staff position ("facility coordinator") or a chaired committee to review and evaluate each office's library or related information services and <b>compile</b> a list of user needs for that specific office which addresses specific areas of concern, degree of expertise required, and the basic services required for each area of concern. They must compare each area and provide a list of the facility's "basic needs." They must coordinate these efforts with the Office of Information Services noted above.</li> <li>6. That offices <b>provide</b> their professional staff training in use of automated office equipment, including the sophisticated technology of COM, microfiche duplication, etc., and how to access it.</li> <li>7. That each office <b>provides</b> the "facility coordinator" the training they need to accomplish their work and assist others in personal file preparation and/or use.</li> <li>8. That this work <b>be continued</b> to determine core journals in each area of concern in the field offices, and to determine the availability of these core journals.</li> <li>9. That this work <b>be continued</b> to develop the data base and thesaurus already started by this study, computerize it, and provide access to the data base by each analyst who needs information on MA methods, pest biology, pest control, and regulatory concerns. [In a recent report by the US GAO, Report #CED-88-44 Feb. 4, 1988, Accession # 111456, entitled "Maze of Food Regulations -- Need for a Regulation Indexing System," the GAO noted the problem of dealing with food <u>transportation</u> regulations (of which they</li> </ol> <p style="text-align: right;">165</p>	<p>cited some 38,000 separate direct and indirect actions) and the maze of 14 federal agencies and/or commissions which control or affect the industry. Since this deals with only transportation aspects, imagine the difficulty involved when considering all other aspects of food regulation including such agencies and organizations as FDA, USOC, USDA, State Regulations, EPA, OSHA, AQAC, and IAMPIS (3-A standards), not to mention the corresponding ISO and related international standards.] That it <b>prepares</b> a publication describing the system and accessibility.</p> <ol style="list-style-type: none"> <li>10. That this work <b>be continued</b> to organize, find a publisher, and as soon as possible, begin publication of MA Newsletter. That it <b>develops</b> a distribution list for MA people.</li> <li>11. That this work <b>be continued</b> to finish the development of the SDI profile on MA work and submit the request to the Bureau of Foods' TIS group for monthly updates.</li> <li>12. That EDRO <b>investigates</b> the feasibility and usefulness of acquiring a video oriented telecommunication network as an adjunct to EMS.</li> <li>13. That OPE and EDRO <b>review</b> the policy and procedures with regard to background and bibliography inclusion in compliance programs and compliance policy guides. If the information is important enough to be required by those conducting the work, then set up a mechanism to either distribute the information with the program or acquire it by some other means.</li> <li>14. That, as with the industrial chemical group and the mass spectrometry group, microanalysts <b>should be represented</b> in EDRO by a committee or <b>have</b> a specific liaison representative present in each major decision making body which has a direct impact on the kind or quality of work produced, in particular where competing forces are involved. For example, we need a science advisor who specializes in MA concerns, and we require <b>input</b> in equipment and equipment recommendations and to general budget considerations, in particular to professional or staffing considerations and the recognition of specialist positions.</li> <li>15. That this work <b>be continued</b> to develop an inventory of microanalytical resources of national, regional, state, or private concern. That it <b>be published</b> in order that they might be used. (Each of these areas have been initiated or incorporated into this study, but it falls outside the scope of this report.)</li> </ol> <p style="text-align: right;">166</p>
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Technical writers have been struggling with mandative *that*-clauses for decades. This two-page list of recommendations from an FDA report includes eighteen mandative clauses: eight subjunctive, six indicative, three non-distinct, and one modal. The writer uses the subjunctive whenever the verb phrase includes a form of *be* and the indicative whenever the verb is something else, such as *establishes* or *prepares*. The single use of the mandative *should* occurs in a clause with a long prepositional phrase between *that* and the clause's subject. If we were editing this document, we would use the subjunctive in all mandative clauses. Source: Biehl & Smith (1982)

# Plagiarism and Copyright: An Analysis of Technical Communication Textbooks

By Michele Mosco

## ABSTRACT

**Purpose:** Students enroll in college to gain expertise for the workplace. Students are trained in academia to avoid plagiarism by citing sources and refraining from copying others' written works. However, in workplace writing and technical communication, common workplace practices reuse, repurpose, and remix content of works authored by others. Unfortunately, this causes a significant disconnect between what students learn and how this learning applies in the workplace. The following questions guided the study:

1. How do the latest editions of widely used technical communication textbooks in the United States teach students about plagiarism, collaboration/authorship, copyright, and ethics?
2. How do the approaches used in textbooks align with workplace practices?

**Method:** In the first phase of the analysis, each textbook was searched to locate any depictions of plagiarism, collaboration/authorship, copyright, and ethics as they relate to the workplace. Then a qualitative content analysis was conducted using a rating scale developed incorporating suggestions researchers made on how to best teach plagiarism and copyright infringement avoidance.

**Results:** Each of the eight texts was rated on each criterion with a possible total of 30 points. Most texts scored 10 or less, one scored 12, and two of the texts scored 15 or above. The extent to which introductory textbooks address each of the criteria was generally abysmal. The texts largely did not address common types of workplace writing and how copyright and plagiarism apply in those situations.

**Conclusion:** The majority of widely used introductory technical communication textbooks do not thoroughly and clearly explain plagiarism, collaboration/authorship, copyright, and ethics in workplace writing. Additionally, these textbooks do not present context-specific scenarios to which students can apply this information. However, several of the texts do provide examples of workplace activities that contradict academic views of authorship.

**Keywords:** Plagiarism, workplace writing, technical communication, authorship, and copyright

## Practitioner's Takeaway:

- Most technical communication textbooks continue to emphasize avoiding plagiarism and "copying." However, this emphasis is problematic because workplace writing often incorporates work written by others. Specific examples include the use of boilerplates/templates, single-sourcing, content reuse, collaboration, and ghostwriting.
- Whether or not the students' understanding of these topics increases after completing more advanced writing courses is unknown.
- New graduates will likely need mentoring when they enter the workplace to develop their understanding of the nuances of copyright and plagiarism applied to their work.

## Plagiarism and Copyright

### INTRODUCTION

As early as kindergarten, children are taught not to copy others' work. In third grade, for example, the term *plagiarism* is introduced as using another person's works or ideas without proper credit, and plagiarism is "bad" (Common Sense, 2018). According to the Common Core State Standards (2019a & 2019b), which guide instruction in 41 states, fourth-grade students must provide a list of sources for their written work. The emphasis on avoiding plagiarism and copying continues through high school, where the consequences of plagiarism are more serious. When students enter college, they must adhere to a code of conduct or an academic integrity agreement. Enumerated are the ways in which a student can violate this code, leading to a series of increasingly grave penalties (which may not actually occur, but that is the subject of another study). Researchers have noted that students are often confused about the differences between plagiarism and copyright as well as the specific actions that are allowable (Auman, 2014; Marshall, & Garry, 2005; Rife, 2010, 2013).

Because plagiarizing or infringing on copyright can have dire consequences for someone in the workplace, it is important for students to understand how to avoid these in their writing. Not only are there legal consequences for infringing, damaging the reputation and integrity of both the writer and his/her employer can have serious financial effects. Therefore, an understanding of how to avoid plagiarism and copyright infringement is important.

In "Rethinking Plagiarism for Technical Communication," Reyman (2008) was one of the first researchers to argue that the emphasis on citing sources and refraining from copying others' written works is problematic in the field of technical communication by the very nature of the types of writing technical writers produce. Later researchers agreed (Louch, 2016; Zemliansky & Zimmerman, 2014). Students enroll in college to gain expertise for the workplace. Unfortunately, in many instances, there is a significant disconnect between what students learn and how this learning applies in the workplace.

But this problem affects more than just those employed as technical writers or technical communicators. Instead, as Kimball (2017) argues, "much of the rest of the world's population is actually engaging in the act of technical communication

every day" (p. 340). Indeed, the Society for Technical Communication (STC, 2018a) defines technical communication as "any form of communication that exhibits one or more of the following characteristics: Communicating about technical or specialized topics. . . Communicating by using technology. . . Providing instructions about how to do something. . ." This means universities need to consider that although students may not be destined for employment as "technical writers," it is highly likely they will develop technical communication in their future workplace.

Non-technical communication majors may find themselves in an introductory technical communication class or a service course, which are "the introductory courses for non-majors delivered primarily as a service to other departments or programs on campus" (Meloncon & England, 2011, p. 398). For some students, then, the introductory course may be their only exposure into specific technical communication content and their last writing course before leaving the university.

While it is true that specific practices and procedures vary from company to company, it is safe to say that typical workplace activities in technical communication rarely include the "single-authored, original works" that students produce in academia (Reyman, 2008, p. 61). Instead, they commonly engage in writing activities that include using boilerplates and templates, single sourcing, and repurposing content (Reyman, 2008). Louch (2016) agrees that in technical writing, writers "reuse, remix, and remarket" content, creating based on already-existing works (p. 27). More recently, Lanier's (2018) research on workplace issues for technical communicators corroborated the common workplace activities enumerated by both Reyman and Louch. The collaborative nature of workplace communication contradicts academia's requirement that every student needs to do their own work.

Common workplace tasks, such as reusing content, do not abide by what students' academic careers have taught them about avoiding plagiarism and copyright infringement. The concepts of authorship and textual ownership are vastly different in the workplace and academia (Reyman, 2011; Stillman-Webb, 2017). The repurposing of content is in "direct contradiction of [the students'] academic training" (Louch, 2016). Zemliansky and Zimmerman (2014) acknowledge the disconnect and argue that the academic practices of



text ownership need to be reconciled with professional practices to prepare students for “the complex realities of working in a globalized world” (p. 163). Rife (2010) suggests that “educational institutions may want to work harder to help students understand the ways in which paradigms of authorship differ between workplace and educational cultures, or in international contexts” (p. 63).

Even the ethical principles statement for the Society for Technical Communication states, “Before using another person’s work, we obtain permission” (STC, 2018b). However, obtaining permission and attributing authorship is not always required in the workplace, depending upon the circumstances. But what are these settings? Do the textbooks teach which situations do not require permission?

If the purpose of a technical communication education is to prepare students for the reality of the workplace, students need to be exposed to the intricacies of copyright and plagiarism and how both apply to typical workplace activities and practices such as those enumerated by Lanier (2018), Louch (2016), Reyman (2008), and Stillman-Webb (2017). Therefore, textbooks for introductory technical communication courses should adequately describe copyright and plagiarism and general expectations in terms of the workplace as well as the classroom.

One of the undergraduate/graduate-level courses I currently teach in the technical writing and communication department is a course that focuses solely on intellectual property and copyright in technical and professional communication. Obviously, this level of detail cannot be included in introductory textbooks; however, there should be some instruction on plagiarism, authorship, copyright, and textual ownership as they are incorporated in both academia and as standard industry practices. This instruction will better prepare students for the workplace, ensuring that what they produce is both ethical and legal. Students majoring in communication, technical communication, or writing would naturally develop a more complex understanding of the field of intellectual property in advanced courses.

## CHANGING COMMUNICATION IN WORKPLACE ACTIVITIES

From my previous experience with introductory technical communication textbooks, instruction includes little more than plagiarism avoidance (cite your sources) as well as copyright infringement avoidance (do not copy others’ work). Except for perhaps a cursory paragraph on work for hire and ethics in the profession (Reyman & Lay Schuster, 2010), the nuanced legal intricacies of authorship, collaboration, and content reuse as they exist in the workplace have not been incorporated. However, new editions of technical communication textbooks should, in theory, include discussions of copying and plagiarism in the context of common workplace activities. But do they? This research then seeks to answer these questions:

1. How do the latest editions of widely used technical communication textbooks in the United States teach students about plagiarism, collaboration/authorship, copyright, and ethics?
2. How do the approaches used in textbooks align with workplace practices?

## REVIEW OF THE LITERATURE

### Textbooks and Their Role in Education in Technical Communication

Harwood (2017) noted, in many courses, “The [text] book functions as a de facto syllabus” (p. 264). This means the content in the textbook often dictates what will be addressed throughout the course (Matveeva, 2007; Wolfe, 2009). A textbook analysis, however, “can provide only a partial picture of classroom reality,” and faculty could indeed supplement textbook content with their professional knowledge and other materials (Matsuda & Matsuda, 2011, p. 173–174).

Many faculty, especially adjunct and other contingent faculty, because of the strain of high teaching loads, lack of support, and lack of preparation time (AAUP, 2010, 2018), rely on the textbook for the course structure. In interviews with program administrators, Zarlengo (2019) concluded that faculty “rely heavily on textbooks to shape their service courses” (p. 126).

Contingent faculty (non-tenure track, adjuncts, graduate assistants) teach the majority of classes in higher education (AAUP, 2010, 2018) and are assigned

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primarily to introductory courses (Morreale, Myers, Backlund, & Simonds, 2016; Reichard, 2003) or service courses (Kimball, 2017; Zarlengo, 2019). Overall, contingent faculty teach most of the technical communication courses (Read & Michaud, 2018), including 83 percent of the service classes in technical communication (Meloncon & England, 2011). Thus, it is probable that contingent faculty, especially adjunct faculty, rely on the textbook to guide course content. Therefore, the content of the textbook should include an adequate explanation of copyright and plagiarism both in academia and in the workplace.

### How Avoidance of Plagiarism and Copyright Infringement is Currently Taught in Technical Communication

The emphasis on plagiarism and copyright infringement in academia is generally on exposing plagiarists (Reyman, 2013). While there is often a chapter/section in technical communication textbooks on ethics, the emphasis is often on product liability and safety; a cursory mention of copyright and perhaps a sentence or two about plagiarism may also be included. Textbooks send the message that copying any text from a source created by someone else is strongly discouraged even when/if fair use guidelines are applicable. Additionally, both plagiarism and copyright are presented in an American context only with no consideration of how it connects to the global workplace and economy.

This approach is justifiable when students are writing academic papers in the university. Indeed, appropriately citing sources is expected in academia. Students are required to incorporate others' work into their own under specific fair use conditions.

However, in the workplace, there are many more contextual details that must be considered when determining the legality and ethics of copying. Universities prepare students to enter the workplace, and the course textbook should support this role.

### Workplace Practices that Run Counter to Current Teaching Practices

"Single-authored, original works" are rarely produced in a technical communication workplace (Reyman, 2008, p. 61), and most works are authored by many (Lanier, 2018; Louch, 2016; Zemliansky & Zimmerman, 2014). Indeed "new delivery mechanisms and development tools have changed what

[technical communicators] do and how [technical communicators] work" (Stevens, 2018). In 2001, Burnett pointed out that 75–85 percent of writing in the workplace is collaborative, and more recently Bremner (2018) stated that collaborative writing is "highly pervasive" (p. 57). Single authored works are becoming a rarity in the workplace.

As an example, more than a decade ago, researchers noted that single sourcing was important for technical communicators to know (Eble, 2003; Williams, 2003). Evans (2013) explains that single sourcing affects how information is developed in the workplace. The content (what is being communicated) and the format (how it is being communicated) are separated. Content is not conceived of as an entire document, but rather, parts of the document that may be written by different people at different times in different hemispheres. These contents reside in a component content management system (CCM) that provides the structure for individual modules of information to be quickly accessed when needed. Costs are reduced when content is reused instead of being rewritten. The writer assembles components written by other writers, perhaps adds some of his/her own textual content, and then provides the communication in the format required. This internal process does not require the original writer's approval to use the previously authored content because the owner of the copyright for that work was the employing corporation. Obviously, content authored outside of the organization requires permissions in the form of a copyright release if fair use (discussed later) cannot be substantiated.

Increasing globalization means that the workplace, and thus the products developed by writers as well as the writing incorporated within, are often destined for an international audience. Therefore, technical communication textbooks need to show students how notions of "copying" and ownership are culturally dependent (Reyman, 2008) and that "culture-based norms of collaboration" affect ownership of text (Zemliansky & Zimmerman, 2014). And though there has been significant harmonization among intellectual property rights in countries worldwide, there are still substantial differences in law that affect workplace processes such as reuse. Writers in multinational corporations should understand that the law may be different in different countries. Textbooks should

acknowledge this so that students are prepared for the workplace.

Other workplace practices common in technical communication also affect the authorship and copyright ownership of communication products. Configuration of development tools and changes in organizational structures challenge the notion of single-authored products (Stevens, 2018). Documentation as code (docs to code), Application Programming Interfaces (APIs), and Darwin Information Typing Architecture (DITA) have changed workflows and the types of communication consumed and created in the workplace. Customer-specific configurations may reuse or duplicate documentation used for other customers (Parson, 2019). Video is also becoming more common as an end-product. Certainly, the open-source movement affects the ownership of works created using open-source software. And finally, technical communication includes social documentation, the practice of incorporating user-developed content into documentation for a specific technological program (Gentle, 2012). Textbooks should adequately explain how these practices affect copyright ownership and how to avoid infringement and plagiarism.

Although it is not practical for an introductory textbook to elaborate on all these practices, the textbook should provide students with a general understanding that workplace activities will incorporate work written by others in a manner very different than academia.

### **Proposed Approaches to Avoiding Plagiarism and Copyright Infringement for Technical Communication**

To properly educate students who will soon become workplace writers, textbook content must include an overview of plagiarism, collaboration/authorship, copyright law (including fair use), and the ethics of these. However, because these concepts are often context-sensitive, they need to be studied within the context of typical workplace scenarios, and these scenarios should consider the probable differences when multinational corporations are involved.

The textbooks need to explain how “. . . authorship functions differently. . . in the workplace” (Stillman-Webb, 2017, p. 293). This instruction should include an explanation of copyright in work for hire, corporate authorship, and fair use, providing a “more nuanced view of textual ownership” (Reyman, 2008, p. 64).

Moore (2007) believes that discussion should center around the contextual nuances of case studies. Similarly, Stillman-Webb (2017) stresses that “workplace laws, policies, debates, and case studies” must be emphasized in conjunction with academic discussions of copyright and plagiarism avoidance (p. 299).

Students enter college without a strong foundational knowledge of plagiarism and copyright infringement as they relate to academia (Murray, Henslee, & Ludlow, 2016; Myers, 2017; Rodriguez, Greer, & Shipman, 2014). In fact, Henschel (2010) found that students were “surprised and a little fearful” that content reuse in any form was sanctioned by the faculty (p. 243). And according to Rife (2010), this confusion seems to continue into the workplace as professional writers “do not feel they have been properly educated in their writing programs. . .with respect to legal implications for. . .organizational/corporate authorship, and collaborative or joint authorship” (p. 62).

So, what do students currently learn in textbooks for introductory technical communication classes?

## **METHODOLOGY**

### **Sample Selection**

A search for “technical communication” on Amazon.com yielded hundreds of books. Selection criteria were used to narrow the sample to textbooks frequently used in introductory technical communication courses. Selection criteria specified the words “technical communication” or “technical writing” had to be in the book title. However, titles that specified an industry (i.e., engineering, medical, etc.), specified a narrow focus (i.e., Readings in. . .), or were not published in the United States were eliminated because this study focuses only on broad surveys of the field of technical communication.

The first 100 books from the Amazon.com search were considered for the survey and down-selected to the eight used in the study. Identifying the texts most often used in academia revealed many were outdated with a copyright/publication date older than 2017. Because this research seeks to influence current instruction on intellectual property in the field, textbooks selected had to have a copyright date of 2017 or newer. Before these older texts were eliminated from the sample, a search of the publisher’s website was conducted to determine if an updated edition was available. Additionally, because

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best-selling textbooks are generally those that have been used in academia for a length of time, only books with a third edition or higher were included in the sample. As suggested by Matsuda and Matsuda (2011), handbooks, brief textbooks, and reference books were eliminated from consideration.

Many textbooks, however, are not available through Amazon.com. So, websites for the major textbook publishers in the field—Cengage, Pearson, Macmillan, Routledge—were searched using the stated criteria. As a result, several additional texts were added to the sample. Open-source books were not considered for this study. See Table 1 for a list of textbooks included in the sample. Note that the books were reviewed in print format except for *The Agile Communicator*. None of the ancillary materials for the texts were examined as contingent faculty often do not know they should request them or do not have the time as the course start date is imminent.

### Data Collection and Analysis – Phase 1

This content analysis studies textbook depictions of plagiarism, collaboration-authorship, copyright, and ethics in technical communication.

Matsuda and Matsuda's (2011) first phase analysis method was modified slightly for use in examining the textbooks. The table of contents and index as well as the actual text from chapter content were examined for any representations of plagiarism, collaboration/authorship, copyright, and ethics. These depictions were classified by their location in the text: chapter, section, box, or graphic. As the data collection began, it became obvious that the terms “teams,” “teaming,” and “teamwork” were often used to describe collaboration, so these terms were used interchangeably with “collaboration” in this data collection.

Table 2 illustrates the distribution of the plagiarism/collaboration-authorship/copyright/ethics features in the sample textbooks.

As expected, the majority (75 percent) of the texts included a chapter on ethics, although the contents of the chapters varied as discussed later. Five (62.5 percent) of the texts focused on collaboration (teams/teaming/teamwork) as a separate chapter. None of the texts included an entire chapter on plagiarism or copyright.

Each text's chapters were further subdivided into sections. A heading of some type began each “section,” and there was a two-paragraph minimum to be

**Table 1. Textbooks included in sample**

Title	Abbreviated Name	Author(s)	Edition	Publication Year
<i>Technical Communication Process &amp; Product</i>	Process & Product	Gerson & Gerson	9th	2018
<i>Practical Strategies for Technical Communication: A Brief Guide</i>	Practical Strategies	Markel & Selber	3rd	2019
<i>Technical Communication Today</i>	Technical Communication Today	Johnson-Sheehan	6th	2018
<i>Technical Communication: A Reader Centered Approach</i>	Reader Centered	Anderson	9th	2017
<i>Technical Communication</i>	TC Markel/Selber	Markel & Selber	12th	2018
<i>Technical Writing for Success</i>	Writing for Success	Smith-Worthington & Jefferson	4th	2019
<i>Technical Communication</i>	TC Lannon/Gurak	Lannon & Gurak	15th	2020
<i>The Agile Communicator: Principles and Practices in Technical Communication</i>	The Agile Communicator	Baehr	3rd	2019

Table 2. Results of Phase 1 data collection and analysis (N = not present)

Component	Content item	Process & Product*	TC Markel/ Selber	Technical Communication Today	Reader Centered Approach	Practical Strategies	Writing for Success	TC Lannon/ Gurak	The Agile Communicator
<b>Chapter</b>	Plagiarism	N	N	N	N	N	N	N	N
	Collaboration	N			N		N		
	Copyright	N	N	N	N	N	N	N	N
	Ethics				N				N
<b>Section</b>	Plagiarism				N		N		N
	Collaboration						N		
	Copyright						N		
	Ethics								N
<b>Paragraph</b>	Plagiarism								
	Collaboration								
	Copyright								
	Ethics								N
<b>Index</b>	Plagiarism				N				N
	Collaboration								
	Copyright								
	Ethics								N
<b>Table of Contents</b>	Plagiarism				N		N		N
	Collaboration				N				
	Copyright						N	N	N
	Ethics								N

*Note:* Per discussion earlier, the terms teams, teaming, and teamwork may substitute for the term collaboration.

\*All titles in table abbreviated. See Table 1 for abbreviated name.



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considered a section (rather than a paragraph). Further, it was assumed that textbooks would have a section on a topic if an entire chapter was devoted to the topic. Three of the texts did not include even a full section on plagiarism, and one did not provide a section on copyright or collaboration.

Within each section, each paragraph was scrutinized to determine if the topics of plagiarism, collaboration, copyright, and ethics were included. Not surprisingly, all but one of the textbooks included at least a cursory look at the topics under study (except for *The Agile Communicator*, which did not include any paragraphs about ethics).

The table of contents and the index were the two sections that contained the smallest unit of measurement for a topic to be considered “present.” Accordingly, these two sections were searched for the following keywords: plagiarism, collaboration, copyright, and ethics. The indices of all the texts contained the keywords in some manner except for *Reader-Centered Approach* (the keyword “plagiarism”) and *The Agile Communicator* (the keywords “plagiarism” and “ethics”). Not all the texts include the same level of detail in the table of contents. *The Agile Communicator*

only lists broad topics, *Technical Writing for Success* adds subtopics, and the rest provide a detailed level of granularity on each chapter’s contents.

### Data Collection and Analysis – Phase 2

A qualitative content analysis was then conducted. A rating scale was developed using researchers’ recommendations for teaching plagiarism and copyright infringement in technical communication (see Table 3; Louch, 2016; Moore, 2007; Reyman, 2008, 2011, 2013; Rife, 2010; Stillman-Webb, 2017).

Each textbook was rated on the extent to which it fulfills each of the 10 criteria using a 0–3 Likert scale, with 0 indicating the text does not fulfill the criteria at all and 3 indicating the text fulfills the criteria.

The sum of each title’s scores was computed. Only three of the texts scored more than 10 (on a scale of 30). These were both texts authored by Markel and Selber (2019, 2018), *Practical Strategies for Technical Communication* and *Technical Communication* as well as Anderson’s (2017) *Technical Communication: A Reader-Centered Approach*. Each criterion is discussed in detail in the Results section with a close examination of the highest-scoring texts (see Table 4).

**Table 3. Textbook evaluation criteria (Adapted from Louch, 2016; Moore, 2007; Reyman, 2008, 2011; Rife, 2010; Stillman-Webb, 2017; Zemliansky & Zimmerman, 2014; Rife, 2010)**

<b>Legal Definitions of Authorship:</b>
Explain what authorship is within the context of the workplace.
Explain that the legal author is different from standard solitary view of authorship.
Explain how work for hire affects ownership of text.
Acknowledge that most workplace writing does not belong to the writer.
Discuss fair use in conjunction with plagiarism.
Demonstrate that the legality of copying is context specific.
Discuss copyright law in conjunction with plagiarism.
Explain that there are cultural differences in both attitudes towards “copying” but there are also national differences in intellectual property laws.
<b>Scenarios..... Does textbook...</b>
Present context-specific scenarios that require students to evaluate the legal/ethical facets of the copying.
Provide examples of workplace activities that contradict academic views of authorship.
Demonstrate that there are no simple answers in terms of plagiarism.

Table 4. Results of Phase 2 data collection and analysis

Does textbook...	Process & Product *	TC Markel/Selber	Technical Communication Today	Reader Centered Approach	Practical Strategies	Writing for Success	TC Lannon/Gurak	The Agile Communicator
Explain that the legal author is different from standard solitary view of authorship	0	1	0	1	1	0	0	1
Explain how work for hire affects ownership of text	0	3	0	1	3	0	3	0
Acknowledge that most workplace writing does not belong to the writer	0	2	0	1	2	0	0	1
Discuss fair use in conjunction with plagiarism	0	3	1	2	3	0	3	1
Demonstrate that the legality of copying is context specific	1	2	0	1	0	0	0	2
Discuss copyright law in conjunction with plagiarism	2	3	1	3	3	0	1	1
Present context-specific scenarios that require students to evaluate the legal/ethical facets of the copying.	1	0	0	0	0	1	0	0
Provide examples of workplace activities that contradict academic views of authorship	3	2	0	2	2	0	0	3
Demonstrate that there are no simple answers in terms of plagiarism	2	1	0	0	1	0	0	1
Explain that there are cultural differences in both attitudes towards "copying" but there are also national differences in intellectual property laws	0	1	0	1	1	0	0	0
Total	9	18	2	12	16	1	7	10
<i>Note:</i> Rated on a 1-3 Likert scale where 0 indicates the text does not fulfill the criteria at all and a 3 indicating that the text does fulfill the criteria. * All titles in table abbreviated. See Table 1 for corresponding codes.								

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### RESULTS AND ANALYSIS

The rating scale presented in Table 3 was developed from researchers' suggestions on how avoidance of plagiarism and copyright infringement should be taught. These were enumerated in the "Proposed Approaches" section. The textbook samples were scrutinized to determine how each presented the content suggested or included the scenarios proposed.

#### Legal Definitions of Authorship, Work for Hire, and Ownership

An explanation of legal authorship should begin by explaining the traditional view of an author, namely that the person who creates something is the copyright owner. It should then differentiate between creating work and owning the copyright to the work. The text should clearly explain how authorship differs from ownership and how collaboration among writers affects copyright ownership.

Markel and Selber (2018, 2019) specifically ask the reader why the creator of a work would not be the owner of the copyright before explaining the reasoning: "The answer lies in a legal concept known as work for hire. Anything written or revised by an employee on the job is the company's property, not the employee's" (2018, p. 24; 2019, p. 22). However, only Lannon and Gurak (2020) provide further explanation of work for hire and copyright ownership by addressing non-employees who create content: "Contract employees may be asked to sign over the copyright to materials they produce on the job" (p. 143). Both of the Markel and Selber texts (2018, 2019) indicate that employees would generally not own the rights to the work they create; however, they do not go a step further and state that most of the works an employee creates are owned by the employer.

#### Cultural attitudes and national differences in law

Although most of the texts tackled the topics of intercultural communication and attitude differences, few explained that intellectual property laws as well as a culture's attitudes towards "copying" were important considerations in workplace writing. Anderson (2017) states only that "ethical standards for citing sources differ from culture to culture. . ." and the ones that are listed in the text only "apply in the United States, Canada, and Europe" (p. 84). However, there are

variations in copyright law even between neighboring countries, and this is not explicitly stated by Anderson, although both texts by Markel and Selber (2019, 2020) write that "exporting goods to countries with different laws is a . . . complex topic" (p. 28, 37). While it is not expected that the texts would go into any detailed explanations of the differences between countries, students would benefit from a general warning that there are differences and a specific example. This is unfortunate given the global reach of major corporations, many of which have a physical presence on several continents.

#### Copyright law vs. plagiarism

Since copyright and plagiarism are often confusing to students, a solid explanation of how the two are connected is in order. Copyright governs *the right to copy* something that is another's intellectual property. If a person copies a movie without getting permission from the copyright owner, it constitutes copyright infringement similar to software piracy and is a criminal law offense. If a person copies quotes from a text to support their assertions and does not attribute the source, this is plagiarism. However, a copyright owner's rights are not absolute, and small portions of text may be reproduced under the fair use exemption (explained later).

Markel and Selber (2018, 2019) provide this clarification by building on what students know, the concept of plagiarism. They explain that plagiarizing is an ethical issue, one that could get a person fired from a job or expelled from school, but the person would not be "fined or sent to prison" (2018, p. 24; 2019, p. 21). They continue by explaining that copyright, however, is a legal issue that could result in fines or imprisonment (Markel & Selber, 2018, 2019).

While Gerson and Gerson (2018) also discuss plagiarism in conjunction with copyright infringement, their explanation leads a student to believe that avoiding copyright infringement is as easy as citing your sources. In a section headed "Copyright Laws," the authors explain that "Taking words and ideas without attributing your source through a footnote or parenthetical citation is wrong. You should respect copyright laws" (Gerson & Gerson, 2018, p. 128). This statement seems to imply that a person can avoid copyright infringement merely by attributing the

source, which is not true—a clearer explanation of when and how attribution matters is needed.

### Fair use and plagiarism

Texts should include an elaboration of §107 of the Copyright Act of 1976, 17 U.S.C. This includes the uses that favor fair use (i.e., teaching, research, criticism, etc.) as well as listing the four fair use factors and describing how they are applied. These factors are:

- 1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
- 2) the nature of the copyrighted work;
- 3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
- 4) the effect of the use upon the potential market for or value of the copyrighted work.

The discussion of these factors and their applications should help students avoid plagiarism and copyright infringement. However, none of the texts discuss all these applications.

In “Chapter 4 Weighing the Ethical Issues,” Lannon and Gurak (2020) present information about legal issues and plagiarism, indicating that readers should “Know the limitations of legal guidelines and avoid plagiarism” (p. 69). Then three chapters later, in the section “Frequently Asked Questions about Copyright,” they list the four fair use factors contained in the United States Code. Lannon and Gurak go on to say that “Courts differ on when and how to apply the four fair use questions, especially in cases related to digital media and material used from the internet” but provide no examples (p. 142).

Baehr (2019) provides no explanation of the meaning of fair use within the text; however, one of the end-of-chapter assignments is to research fair use and how it is implemented in both academic and workplace writing. If students are not assigned that question, though, they would not understand how fair use applies to their work. Additionally, the text incorrectly states that “Fair use laws generally permit the use of 250 words from a single-source, with citation” (p. 67). However, the government’s information about fair use acknowledges that there is no set number of words that are allowable (United States Copyright Office, 2019).

Markel and Selber (2018, 2019), as well as Lannon and Gurak (2020), correctly explain that in determining fair use, the amount copied must always

be considered in terms of its substantiality to the whole. Johnson-Sheehan (2018) indicates that “especially if you are a student,” copying with attribution may be considered fair use (p. 92). Johnson-Sheehan (2018) explains that uses for the purposes of “criticism, comment, news reporting, teaching...scholarship, or research” (Copyright Act of 1976, 17 U. S. C. § 107) are more favorable to fair use and states that “if your use of materials falls under these guidelines, you may have a *limited* right to use the materials without asking permission” (Johnson-Sheehan, 2018, p. 92) but does not explain the limitations on fair use nor list the four fair use factors.

### Summary of texts’ handling of ownership issues

None of the texts completely address the criteria in Table 3 (although both texts by Markel and Selber [2018, 2019] provide limited coverage of these criteria). Most of the texts, however, are deficient in presenting how legal ownership of content differs from traditional authorship. Of the non-Markel/Selber texts, only the Lannon and Gurak (2020) text presents a clear and complete explanation of work for hire and its relationship to the work of a technical communicator. Likewise, most of the texts do not provide a clear discussion of the distinctions between copyright infringement and plagiarism. All but two of the texts include some presentation of “fair use” and the factors associated with it.

### Context-Specific Scenarios

Moore (2007), Reyman (2008), and Stillman-Webb (2017) all proposed using specific scenarios so that students can apply the information they learned about authorship, fair use, and copyright. Reyman (2008) explains that scenarios demonstrate to students that a determination of plagiarism or copyright infringement cannot be determined by a “black-and-white approach” (p. 66). Reyman (2008) suggests that scenarios characterize plagiarism as more complex and context-sensitive than the all-too-present “do not steal” mandate (p. 66).

Most of the texts included a few scenarios for students to practice applying the law and ethics to a specific situation. These cases did not focus on copying, copyright, or plagiarism, except for two texts (Smith-Worthington and Jefferson and Gerson and Gerson) that included simple scenarios requiring students to

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evaluate the legal/ethical facets of copying material created by others. These scenarios, however, were simplistic and could easily be answered through a Google search and a routine application of copyright law. It is important to note that the ancillary materials, teachers' guides, supplements, etc., for each of the texts (if available) may indeed include in-depth scenarios for students to evaluate, but for this research, only the student textbooks were reviewed.

None of the texts includes an in-depth case involving copyright or plagiarism similar to two of the nine role-playing scenarios included in *Ethics in Technical Communication: Shades of Gray* (Allen & Voss, 1997). Even cases, such as the two paragraph-long scenarios Reyman (2011) suggests as examples of the “perplexing circumstances” that the workplace presents (p. 349), were not included in the texts. A goal is for students to wrestle with the complexities of authorship, legal doctrine, and ethics, and not necessarily “solve” the cases (Reyman, 2011, p. 364). It is through this struggle that students understand that copyright in the workplace is highly nuanced.

### Workplace activities that contradict academic views of authorship

Five of the texts included information about reuse, single sourcing, templates, or boilerplate (standardized text) materials as common workplace activities. Anderson (2017) indicates that in the workplace, a writer often builds his or her work on the work of other employees within their company, and this is perfectly acceptable—which, of course, runs counter to the traditional academic view of reuse. Markel and Selber (in both texts) explain that in business, “the reuse of information is routine because it helps ensure that the information a company distributes is both consistent and accurate” (2018, p. 24; 2019, p. 21). Two pages later, that they provide examples of acceptable reuses of information.

*The Agile Communicator* includes a range of workplace activities involving content reuse. In Chapter 3, Baehr (2019) discusses legacy documents, explaining that they are “existing content sources [that may be]. . . external (sources outside of an organization) or internal (sources within an organization)” (p. 56). Baehr (2019) points out considerations that need to be made when using such material but refers the reader to a section four pages later, rather than addressing

these considerations in the immediate context. Baehr also discusses single-sourcing and how the content an organization “owns” can be freely used or adapted to develop other company content while emphasizing that reuse of content external to the organization requires citation as a minimum and perhaps a copyright release.

Gerson and Gerson (2018) discuss both boilerplate information and single-sourcing, although the consequences of single-sourcing on copyright and plagiarism are not discussed.

Boilerplate content is also mentioned by Markel and Selber (in both texts), who warn students not to include excessive amounts of another person's writing unless “it is your company's own boilerplate” (2018, p. 26; 2019, p. 23). Unfortunately, they do not explain what boilerplate is, there is no glossary in the back of the book, and the index does not include the word. Not until readers arrive at the next section, the “Ethics Note,” do they learn that boilerplate is a text that is repurposed within a company (e.g., a company profile or product description) so that it does not have to be rewritten every time it is used, saving costs in document production.

### No simple answers

Due to the brevity of each textbook's treatment of the topics, the complexity of plagiarism and copyright laws was not fully apparent. However, Gerson and Gerson (2018) did specifically state, “avoiding intellectual property theft and plagiarism in the workplace is not always clear cut” (p. 129). Had these texts included scenarios that required students to reason the ethics and legalities of the situation, the complications of plagiarism and copyright would, no doubt, be amply illustrated by the specifics of each situation.

## CONCLUSION

I initially included the terms “collaboration,” “teams,” and “teaming” for the first-phase data collection and analysis because I anticipated that workplace activities such as single sourcing and content reuse would be discussed within the context of collaboration. That was largely not the case. Most textbooks that discussed single sourcing, reuse, or boilerplate text included it within the context of intellectual property or plagiarism (e.g., Gerson and Gerson, 2018, and Markel and Selber, 2018, 2019). However, some instances of treatment



of these topics occurred in unexpected contexts, such as *The Agile Communicator's* discussion of boilerplate materials in the context of conducting research (Baehr, 2019).

The textbooks did, however, include some discussion of collaborative writing, such as Gerson and Gerson's (2018) excellent coverage of the use of wikis and Google Docs as team writing tools. However, when discussing principles of collaboration, all but one of the texts were more likely to situate the collaboration into a generic setting without explaining single-sourcing and content reuse. Baehr (2019) did, however, frequently discuss collaborative authoring and reuse as they are practiced in the workplace.

Students enroll in college courses and programs to gain expertise for the workplace. Unfortunately, in many instances, there is a significant disconnect between what students learn and how this learning applies in the workplace. Traditional views of authorship and academia's emphasis on "not copying" to avoid plagiarism run counter to industry practices in the workplace. Textbooks should prepare students to understand the important differences of copyright, plagiarism, and ownership as they pertain to both academia and the workplace. This content analysis found that the extent to which currently used textbooks accomplish these goals is generally grossly deficient.

Reyman (2008) believes it is important for students to understand the inherent complexity of applying copyright law and plagiarism to workplace practices, asserting that this can best be achieved by using realistic teaching scenarios. Not only were most of the texts deficient in the instruction in key concepts, such as fair use and work for hire, but the texts also did not force the reader to grapple with the messiness of workplace scenarios.

Additionally, because of the varying structural organization of the textbooks, information on topics such as plagiarism, ownership, authorship, and copyright was often fragmented (split among several sections in different chapters). Further, the texts did not explore the nuances of copyright and plagiarism in the workplace.

Teaching plagiarism and copyright infringement avoidance by comparing the two in academia (which is the realm with which students are familiar) and then in technical communication has not been incorporated into introductory technical communication textbooks.

This is unfortunate given the increasing intricacies of copyright and plagiarism introduced by workplace practices. Students entering the workplace need the skills to deal with these complexities. However, of the texts reviewed, only the texts by Markel and Selber provide instruction that partially fulfills the criteria proposed by researchers (Table 3 and 4). Likewise, integration of plagiarism and copyright scenarios focused on workplace issues is absent from all but one of the texts. Workplace activities such as single sourcing, legacy documentation, document ecologies, and content reuse are briefly mentioned in a few of them, with only Baehr frequently providing an explanation of these processes in the context of the workplace.

More than a decade ago, Reyman (2008) proposed dialogue between workplace practitioners and academia as vital to fully prepare students for the workplace. What workplace activities involve issues of copyright and plagiarism? How are these issues resolved? Further research is needed to survey practitioners in the workplace to find these answers and incorporate the information into future textbooks.

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## Usability Testing Essentials: Ready, Set. . .Test!

Carol M. Barnum. 2021. 2<sup>nd</sup> ed. Morgan Kaufmann.

[ISBN 978-0-12-816942-1. 448 pages, including index. US\$46.99 (digital).]



The second edition of Carol Barnum's *Usability Testing Essentials: Ready, Set. . .Test!* proves the long-standing value of this volume to the technical communication field by providing a no-nonsense introduction to usability

testing that is useful to both novices and experienced professionals. As mentioned in the Acknowledgments, the core of the book is unchanged and discusses “conducting usability testing, analyzing the results, and reporting the findings” (p. xix). Barnum has largely updated tools and trends that have emerged since her original published book in 2010.

These updates include discussions of remote usability testing (pp. 86–88), a new generation of usability tools that have come to market (pp. 91–94), statistics about who is currently online (p. 108–120), and more. The book continues with a rigorous discussion of the various long-standing methods available to user experience (UX) researchers, including building a UX toolkit (Chapter 2), understanding the psychology of users (Chapter 4), and, of course, planning, preparing, conducting, analyzing, and reporting on usability tests (Chapters 5–10).

*Usability Testing Essentials* is divided into two parts. Chapters 1–4 set the stage for usability by discussing important contextual information. This includes an explanation of the importance of focusing on users, not products (p. 10), definitions for UX and user-centered design (UCD) (pp. 16–18), heuristic evaluation (pp. 46–50), acquiring testing equipment (pp. 70–72), and developing user personas (pp. 120–124). Chapters 5–10 then discuss the process of usability testing in its entirety, including scheduling the initial planning meeting (p. 136), creating the initial test plan (p. 187), recruiting participants (p. 198), creating a testing team (p. 205), choosing feedback methods (p. 237), setting up tests (p. 250), moderating tests (p. 250), collating findings (p. 296), presenting qualitative data (p. 298), and preparing a formal report (p. 328). Chapter 10 focuses on working with international users.

Barnum also includes testing examples, case studies, sample documents, and deliverables garnered from her long history of working in the field. While reading through her book, I didn't find a single element

of usability testing that wasn't thoroughly explained, illustrated, and exemplified through concrete, real-world cases. After reading this new edition, the reader is privy to an incredibly valuable resource: the inner workings of one of the top minds today in usability research.

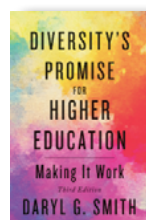
Readers will find in this book a complete workflow for becoming competent usability researchers. Though the book doesn't cover every possible nuance of usability testing—no one volume could accomplish that—*Usability Testing Essentials* is perhaps one of the most complete books on usability testing available. More importantly, it is written where even a complete novice can understand, but it also contains a wealth of wisdom that seasoned professionals will find useful as a reference guide to the most difficult art and science that is usability testing.

### Guiseppe Getto

Guiseppe Getto is a faculty member at East Carolina University. He is also President and Co-Founder of Content Garden, Inc., a digital marketing and UX consulting firm.

## Diversity's Promise for Higher Education: Making It Work, 3rd ed.

Daryl G. Smith. 2020. Johns Hopkins University Press. [ISBN 978-1-4214-3839-9, 376 pages, including index. US\$32.95 (softcover).]



In the third edition of *Diversity's Promise for Higher Education: Making it Work*, Daryl G. Smith sums up years of scholarship and experience. Her essential claim is that diversity is not optional but a moral and practical imperative. By meeting this challenge, institutions of higher education can fulfill their mission statements and achieve excellence.

Even those outside of academia may find the book relevant. Smith examines the cultures of institutions and organizations, synthesizing scholarship from multiple academic disciplines and the business world. Anyone with an interest in how an organization can keep an eye on the zeitgeist—and ride the waves of change rather than be overtaken by them—might find this book useful.

That said, this book is not exactly a “how-to.” It's a book of scholarship, one that—especially in the early

sections, when Smith is laying the groundwork for her argument—draws on numerous other scholars (there are 300 pages of body text and 62 pages of references). This doesn't mean that the prose is dense or dry; it's smooth, accessible, and surprisingly absorbing.

*Diversity's Promise for Higher Education* is broken down into four main sections. In the first, Smith presents the global backdrop against which efforts to achieve diversity are taking place—a world of immigration and changing demographics, of structural inequality too often based on identity (identity as a concept is explored thoroughly). Achieving fairness and equity, according to Smith, has a pragmatic advantage; many scholars “make a direct link between diversity and the health and well-being of democracy.” (p. 8).

The second section argues that universities should treat diversity like they treated technology. That is, just as keeping pace with technology was an absolute imperative, keeping pace with shifts in demographics and culture should be imperative, as vital to institutions' missions.

The third section suggests that those in higher education will have to “interrupt the usual” to make meaningful changes. One chapter examines faculty hiring practices. Another proposes that actively fostering intergroup dialogues will deter conflict and engender creative thinking and learning.

Finally, the last section sums up the book's argument thus far, offers a set of recommendations, and posits that although this time of great global flux is challenging it is also an opportunity that universities dare not miss.

Again, if you're looking for a straightforward “how-to” book with a bulleted list of steps at the end, *Diversity's Promise for Higher Education* may not be for you. Though much is written about implementing diversity, there is a level of abstraction that might be disconcerting to some. If you're looking for a solid background on the issue of diversity, though, and ideas about how and why diversity policies might be implemented at your organization, read this book.

### Scott Black

Scott Black has worked as a textbook production editor and taught writing to engineering students.

### 100 Things Every Designer Needs to Know About People, 2nd ed.

Susan M. Weinschenk. 2020. Peachpit Press. [ISBN 978-0-13-674691-1. 256 pages, including index. US\$29.99. (softcover).]



Every once in a while, a book comes along that is so well-written, researched, and designed that I just can't put it down.

That's how good *100 Things Every Designer Needs to Know About People* is!

What makes it so good is that it's broken down into short segments of a page or two that cover how people read, see, feel, remember, think, and focus their attention, among other interesting topics. Each segment has a “takeaways” section that neatly sums up the contents and emphasizes the relationship to design. In effect, the book's layout and design mimic the way in which humans process information—very clever indeed.

Susan Weinschenk, who holds a PhD in Psychology and an Adjunct Professorship at the University of Wisconsin, uses her passion for research to educate designers about the psychological and physiological factors that affect our perceptions, motivations, and decision making. The book reminds me of the big book series on psychology, sociology, and philosophy, where theories and movements are clearly presented in small chunks of information, something that Weinschenk advises in her section on attention theory.

The first half of the book is focused mainly on visual communication and design, whereas the latter half delves rather deeply into the psychology of emotion and motivation. This content arrangement makes it easy for designers to quickly pick out the most salient parts of the book. However, I recommend reading it in its entirety for anyone who wants to create user-friendly print and online documents or websites.

In fact, *100 Things Every Designer Needs to Know About People* could easily be indexed under psychology or physiology as well as design or user experience as the scope of her research is impressive. She draws upon the areas of cognitive psychology, eye tracking, and visual communication to explore with the reader how the brain works, what our motivations are when viewing objects, and how we make mistakes. Her “takeaway” tips alone represent a potent set of crib notes on how to take advantage of, or even manipulate, our imperfect biological/psychological makeup.

When I'm asked by students or colleagues in education and industry what's the one book I could

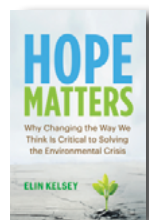
suggest to help them with their efforts to produce effective visual media, I would, without hesitation, recommend this book. I'd put a copy of *100 Things Every Designer Needs to Know About People* in their hands with the complete confidence that it will, in a most enjoyable and approachable manner, open a larger understanding of how to appeal to their very human audience.

### Lynne Cooke

Lynne Cooke is a Clinical Assistant Professor at Arizona State University, where she teaches courses on usability, digital media, and portfolio development. She is also a member of the Arizona Chapter of STC and the Internship Coordinator at ASU.

### Hope Matters: Why Changing the Way We Think is Critical to Solving the Environmental Crisis

Elin Kelsey. 2020. Greystone Books. [ISBN 978-1-77164-777-9. 230 pages, including index. US\$22.95 (softcover).]



Crisis communication is difficult even for small, local problems. When problems extend to the whole world, as in the global environmental crisis, the challenge is daunting. How can we motivate people to act when problems seem insurmountable?

In *Hope Matters: Why Changing the Way*

*We Think is Critical to Solving the Environmental Crisis*, Elin Kelsey provides the answer: If our goal is to motivate action, we must give reasons to hope, without trivializing the problem. She defines hope as optimism based on the possibility of agency and action, not wishful thinking. This is the difference between investing your savings and buying lottery tickets. Focusing relentlessly on negative stories to convince audiences the problem is real creates helplessness and inaction rather than the desired hopeful willingness to act.

Large problems overwhelm us and motivate inaction. Breaking them into smaller problems that are more easily solved makes them feel manageable. Each successful act encourages us to tackle more or larger challenges, as our sense of accomplishment promotes engagement and continuing action. Real-time feedback such as electricity meters and full recycling bins make progress tangible. Reminding people of their agency is essential when the situation seems grimmest; our audience must not move from “I feel hopeless” to “the situation is hopeless.” Forgiving ourselves when we fail or despair can restore courage and liberate us from

demotivational fear-based narratives. We understand our reality by creating explanatory stories, so we must create more optimistic stories. After all, we're not starting at zero: we've already accomplished much and can do more. Kelsey provides many success stories and links to collections, such as the Solution Stories Tracker (<https://storytracker.solutionsjournalism.org/>). The Earth Optimism Summit ([https://en.wikipedia.org/wiki/Earth\\_Optimism](https://en.wikipedia.org/wiki/Earth_Optimism)) offers another path to success.

Greta Thunberg taught us that building community builds resilience because it creates a sense of support and collective action. Social media have therefore become an increasingly crucial communication medium, particularly for the young. As we learned from Covid-19, the words of our social groups can be more persuasive than the words of experts. Community teaches us hope, and hope and despair are both contagious. Which would you rather spread?

Kelsey presents a concise and powerful evidence-based argument for spreading hope based on a consideration of the psychological, social, philosophical, and spiritual factors that motivate us. Although she focuses on the environmental crisis, her message is applicable to other communication challenges. For example, technical communicators have traditionally neglected the emotional responses that determine how people act. Language choice is also important: the binary either/or (succeed/fail) is less effective than both/and: bad and good both exist, and recognizing the bad can motivate us to act, while recognizing the good leads to hope. It's time we paid more attention to these factors.

### Geoff Hart

Geoff Hart is an STC Fellow with more than 30 years of writing, editing, translation, and information design experience. He's the author of two popular books, *Effective Onscreen Editing* and *Writing for Science Journals*.

### Simplicity: The Appeal of Minimalism in Graphic Design

Wang Shaoqiang, ed. 2020. Promopress. [ISBN 978-84-17412-71-5. 240 pages, including index. US\$45.00 (softcover).]



*Simplicity: The Appeal of Minimalism in Graphic Design* showcases examples of minimalist work from over 100 worldwide designers. The book is more an exhibition of successful design than a “how-to”

manual. Each page shows an example of good design without ever going into detail as to what makes it an effective concept. Drawing from the themes often found within the covers, the book uses minimalism in its own form. It plays with examples of design work to produce a cover that balances appropriate amounts of negative space and pictures. The book's color palette mimics many of the design palettes found within it: that of neutral background work and a strong navy color for the main wording. This palette is extended throughout the book itself, as neutrals are used in the background, with navy blue pages added as transition pages between the sections.

The Preface begins with a Dieter Rams quote, "Good design is as little design as possible" (p. 5) that covers three pages: one written in English, one in Spanish, and one in French. It is typed in blue ink against a white background and sets the tone for the whole book. Following a blue title page and a blue contents page, this typeface adds to the cosmopolitan, cutting edge vibe that the book portrays. This is juxtaposed against the title page wording, all lower case, "simplicity, the charm of minimalism." These words are a change, in font and wording, from the actual cover title and lend a feeling of warmth to the worldly nature already attained by the style formatting. The preface asserts that "simplicity has always played a key role in good design" (p. 5), that it creates consistency, is sustainable, and is timeless. "Success. . . is when an idea has found its perfect form" (p. 5). The book is a showcase of such success.

The main body of *Simplicity* begins with the Pictograph section, which shows designs that center around a picture or a symbol as the main design component. As an example, on page 30, the design for "Meg's Tailoring" is centered around a button pictograph.

The next section, Number, involves designs centered around numbers, such as the 2902 Gallery on page 96, whose design is centered on the gallery's unique opening date of 29 February 2008.

The last section, Letter, showcases designs that work with new and innovative use of font. Page 134 displays United Solar Energy's unique use of the letter E.

Rounding out the book is the Index, written in blue ink against a white ground, which gives background information for the designers and design firms celebrated within the book.

Overall, *Simplicity* is an incredibly beautiful book and, while I would have preferred detail about what made each example successful as minimalist design, I enjoyed this book. I enjoyed it as much for the way that it expressed minimalist artistic design as I did for the examples found within it of successful minimalist design.

### Adrian Shrider

Adrian Shrider is a graduate student at the University of Alabama in Huntsville, Alabama. She has a BA in English and is currently working on her Technical Communication Certificate.

### Too Much Information: Understanding What You Don't Want to Know

Cass R. Sunstein. 2020. The MIT Press. [ISBN 978-0-262-04416-5. 252 pages, including index. US\$27.95 (hardcover).]



How do policymakers decide what information institutions are required to release to the public? The answer seems simple: when the "information would significantly improve people's lives" (p. 1). However, within that simple answer lie difficult questions. How do you measure what is significant? What does improving someone's life really mean? Can information damage a person's well-being instead?

In *Too Much Information: Understanding What You Don't Want to Know*, Cass Sunstein, former Administrator of the Office of Information and Regulatory Affairs, explores the world of information disclosure and examines how institutions try to answer these questions. As agencies decide what information to disclose, they try to predict the benefits of the information and measure people's desire for it. One way to value benefits is by monetizing them. When dealing with health information, for example, regulators have established the value of a statistical human life to be about US\$9 million. If they can determine the value of the benefits by estimating lives saved, institutions can perform a cost-benefit analysis to find out if the health information is worth disclosing. Another metric Sunstein returns to often is a consumer's willingness to pay for information. This measurement helps institutions understand what information people want to know and how much they desire it.



Information disclosure is part of our everyday lives, which Sunstein makes clear by providing accessible examples. One of the most memorable is his description of his successful project to require calorie counts on restaurant food, including popcorn at movie theaters. While he thought this was a victory for information disclosure, a friend accused him of ruining popcorn. Throughout the book, Sunstein uses the idea of “ruining the popcorn” to mean information that may be useful to know but unpleasant to hear.

Once information is disseminated, though, its journey isn't over; people still need to receive it. Sunstein devotes a chapter to the psychology of receiving information. People have a “limited mental bandwidth” (p. 162) with which to process information. We also don't like bad news and tend to focus on the present. These psychological factors affect how information should be presented. As a technical communicator, I appreciate Sunstein's advice to keep essential information limited, simple, and salient.

Besides analyzing the disclosure of information from institutions to the public, Sunstein discusses other directions in which information flows. His chapter about the information institutions require from people is especially interesting. He uses the term “sludge” for those mandatory activities (like information-gathering paperwork) that slow down actions like registering to vote, applying for financial aid for college, and canceling magazine subscriptions. While he concedes that some sludge is necessary for privacy and security, one of Sunstein's calls to action is for institutions to analyze and reduce their information-gathering burden on the public. When dealing with information, whether we're providing it or receiving it, Sunstein concludes that sometimes less is more.

### Elizabeth Hardin

Elizabeth Hardin is an STC member and a lecturer in the English department at the University of Alabama in Huntsville, where she teaches technical and business writing. She has a master's degree in English and a bachelor's in Computer Science.

### A Guide to EU Environmental Law

Josephine van Zeven and Arden Rowell. 2021. University of California Press. [ISBN 978-0-520-29522-3. 280 pages, including index. US\$29.95 (softcover).]



For a topic as complicated as environmental law, Josephine van Zeven and Arden Rowell's *A Guide to EU Environmental Law* is an unexpected, easy, informative read. I was struck with the remarkably clear, organized writing and my actual comprehension of the subject matter despite my not having a law background. Since environmental problems affect everyone, addressing audiences other than law students and lawyers was one author-stated goal, which they met with perfection.

The book's aims are clearly outlined in the preface and flawlessly carried out in subsequent chapters. The book is thoughtfully organized to first provide an “overview of key legal actors, types of law, and regulatory tools that the EU (or the United States) uses to address environmental problems” (p. xiv). This initial information, which might otherwise be dry or difficult to comprehend for non-legal audiences, was quite informative. Tables, spotlight boxes that highlight and explain supplemental or complex concepts, chapter summaries, takeaway bullets, list of key terms and definitions, and thought-provoking discussion questions all aid in understanding chapter material. This background information is crucial to understand the second half of the book, which addresses “specific environmental issues that environmental law regulates: pollution, ecosystem management, and climate change.” (p. xiv).

What surprised me most about these chapters was that I learned more about the complexity of these issues and why we need laws to address them than I have understood over the last decade. For instance, climate change has been in the mainstream news since the 1970s; however, there has been little direct or effective action taken to mitigate the issues leading to and resulting from climate change. Reasons for this inaction are spelled out directly with no extraneous text that takes readers off course or drowns them in a sea of complication. To explain three main reasons for causes and effects of climate change and why regulation is necessary in three paragraphs takes technical writing expertise that is noticeable and



appreciated. This is not to say the text is short-sighted or incomplete; on the contrary, concepts are scaffolded to show how one concept and conversation leads to other concepts and conversations and so forth. And once again, chapter supplements aid in the process of providing this information in comprehensible packages. Helpful and interesting appendixes with timelines of EU environmental law, EU membership, additional resources, and a glossary are also included.

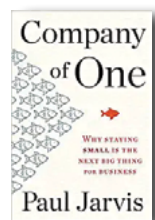
Since environmental problems are everyone's problems, as stated in the beginning, van Zeven and Rowell have provided an accessible interdisciplinary resource that helps readers to understand three major environmental issues and the laws intended to regulate their causes and effects. There is even a companion book on environmental law in the United States should readers want to compare. With or without a background in law, readers can quickly and easily engage with the book content, which in turn can promote meaningful conversations that hopefully will lead to straightforward solutions soon.

### Diane Martinez

Diane Martinez is an associate professor of English at Western Carolina University, where she teaches technical and professional writing. She previously worked as a technical writer in engineering, an online writing instructor, and an online writing center specialist. She has been with STC since 2005.

## Company of One: Why Staying Small is the Next Big Thing for Business

Paul Jarvis. 2019. Houghton Mifflin Harcourt. [ISBN 978-1-328-97235-4. 250 pages, including index. US\$26.00 (hardcover).]



Paul Jarvis left a successful career as an online designer and consultant for major corporations for a more fulfilling solo entrepreneur role. He shares how small or solo business owners can not only survive but thrive in the marketplace and achieve an improved quality of life by

leveraging small businesses' strengths and following the strategy he outlines in his book, *Company of One: Why Staying Small is the Next Big Thing for Business*. Although the book is not written for the technical communication field, it's relevant as many of us work as

solo or small business owners or in companies where we are a department of one.

Jarvis reinforces the topics with examples of entrepreneurs who successfully illustrate the book's strategy and cautionary tales of those who do not. It's interesting to note that several companies cited in the examples are worth millions of dollars. "Small" in this book refers to a business mindset, not profitability. Each chapter ends with a helpful section, "Begin to Think About," that asks readers to consider the chapter's topics as they relate to their own business and personal life.

The main point in *Company of One* challenges traditional advice that small businesses must grow in complexity to compete. Instead, Jarvis asserts that business owners should "...determine which areas of their business need to scale and when it makes sense to do so" (p. 68). Business owners should base their growth strategy on actual profits and not projections.

While some information may not be new to experienced business owners, Jarvis provides practical advice and insights for starting and managing a successful small business. The book's sections on delivering superior customer service and building strong customer relationships contain valuable information. Jarvis stresses that small businesses have an advantage over their larger competitors as they likely have a greater understanding of customer needs. Business owners can define their company, distinguish themselves from their competition, and build their reputation as an authority on a topic by teaching and freely sharing their ideas and nonproprietary information. While Jarvis admits that his proposal may sound controversial, he clarifies it by making a distinction between sharing general ideas and their execution. He uses an example from his own life. Jarvis shares ideas regarding this book's topic freely. However, the execution of his idea (his book) is copyrighted.

Jarvis also advises that it's important for business owners to build trust and a personal relationship with potential customers before they try to sell them a product or service. People are more willing to listen to someone they know and trust.

In the final chapter, he summarizes the book's information by drawing upon his own business story to cover the steps for starting a company of one.

### Ann Marie Queeney

Ann Marie Queeney is an STC senior member with more than 20 years' technical communication experience, primarily in the medical device industry. Her STC experience includes serving as a Special Interest Group leader, 2020-2022 Board member, and current CAC (Communities Affairs Committee) Chair. Ann Marie is the owner of A.M. Queeney, LLC.

### Office Optional: How to Build a Connected Culture with Virtual Teams

Larry English. 2020. Centric Consulting. [ISBN 978-1-7350567-2-2. 214 pages. US\$16 (softcover).]



Larry English has a great story to tell. His story, in part, is about how he is a co-founder and now president of Centric Consulting, a company with a focus on building an office optional approach and a mission of creating a culture of happiness for their employees and clients. Centric is now a 1,000-plus person company with offices in 12 U.S. locations and India.

Larry's story is also about how before founding Centric, he worked in a traditional office instead of his home, putting in long hours. Feeling burned-out at the age of 25, he quit his office job and backpacked around the world with his newlywed wife. He returned home and co-founded—with like-minded friends—the office optional company of Centric. He now lives in Columbus, Ohio.

In *Office Optional: How to Build a Connected Culture with Virtual Teams*, English explains how companies can struggle with creating an office optional environment with an effective culture. He taps into his more than 20 years of experience developing a company where people work remotely in a culture that makes them happy while contributing to the company's success.

English creates a fun, quick, useful, and entertaining read in *Office Optional* as he shares stories about managing remote teams. His goal is to explain how to build a sense of belonging and a culture of trust. He notes that prioritizing people and culture is important as he lets employees set a schedule that works for them. English further states that this approach can motivate people to be even more productive than working in a traditional office.

In a thought-provoking and especially timely statement at the conclusion of his book, English states

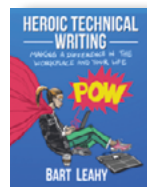
that “if the predictions are correct, the coronavirus pandemic will forever change how people work in many industries, ushering in an era of widespread acceptance of remote work” (pp. 188–189). He further believes that with the right culture, a remote setting can be “somewhere you love working.” (p. 189).

### Jeanette Evans

Jeanette Evans is an STC Associate Fellow; active in the Ohio STC community, currently serving on the newsletter committee; and co-author of an Intercom column on emerging technologies in education. She holds an MS in technical communication management from Mercer University.

### Heroic Technical Writing: Making a Difference in the Workplace and Your Life

Bart Leahy. 2020. Heroic Technical Writing. [ISBN 978-0-578-58165-1. 210 pages. US\$12.99 (digital).]



Do you want to find out what can be “heroic” about technical writing? I was curious when I read the title of Bart Leahy's book. As it turned out, the book is based on the author's blog by the same name (<https://heroictechwriting.com/>).

Readers familiar with the blog know Leahy's foundation in the space business, with a history of working at NASA as an English major. Leahy admits, “Originally, the title of the book was “An English Major at NASA” (p. 202), but then he decided to broaden the scope to help students and young professionals, regardless of careers.

If you are an aspiring writer aiming to get an insight into the life of a technical writer in the US working in the space industry, you will get the most out of the book. By contrast, I have been working for more than 20 years as a technical writer and translator in the software industry in Europe and found some topics in the book quite exotic. For example, I was not even aware of some of the document types (i.e., replies to complaint letters or creative briefs) mentioned as deliverables of a technical writer. I had to look up Small Business Innovation Research (SBIR) proposals in the glossary.

Nevertheless, even with a completely different background and no matter where you find yourself in your technical writing journey, *Heroic Technical Writing: Making a Difference in the Workplace and Your*

*Life* will provide valuable, helpful, and at the same time entertaining information and stories.

Keeping a light, personal tone, Leahy gives advice and shares honest thoughts on a wide range of topics related to technical writing. The book is separated into six major sections: Products, Process, People and Politics, Professionalism, Pursuing Work, and Protecting Yourself.

Remarkably, Leahy also openly talks about mistakes he has made during his career so that the reader does not have to make them. In Chapter 8, he explains: “Sharing my little foibles with you is partly an effort to make my writing somewhat entertaining, partly a reality check for someone who thinks X career is “perfect,” and partly used as an opportunity to show that even full-time technical writers can make mistakes and recover from them” (p.134).

While a lot of statements and musings in *Heroic Technical Writing* seem like common sense and would probably apply to any profession, the book is an important reminder of what working life is about and what “heroic” can mean for technical writing, namely “Be a good person.” (p. 199). What I liked most about the book is that it shows how passionate Leahy is about technical writing—and I strongly believe myself that if you are not passionate about what you do, you will not do it well.

### Karina Lehrner-Mayer

Karina Lehrner-Mayer is an STC Senior member, holds a degree in translation, and has more than 20 years’ technical communication experience. She works as a Documentation Specialist at the Austrian-based headquarters of ISIS Papyrus Europe AG, an international company offering solutions for inbound and outbound business communication and process management.

### WordPress: The Missing Manual® –The Book That Should Be in the Box®, 3rd ed.

Matthew MacDonald. 2020. O’Reilly. [ISBN 978-1-492-07416-8. 480 pages, including index. US\$49.99 (softcover).]



WordPress is a free software originally intended for writing blogs that has evolved to include websites and even e-commerce. While content produced

with WordPress can be stored on its associated hosting service, the software can also be installed on almost any webhost’s servers.

Matthew MacDonald starts at the beginning—installing the software—then takes the reader through increasingly complex changes—including using add-on mini-programs called plug-ins—and ends with adding a shopping cart. On the way, he also covers webmaster topics such as site statistics and search engine optimization.

The book does not assume any previous web coding experience, explaining basic terms and concepts. At times that’s taken a little too far, though. For example, a paragraph that starts with “But if you have any sort of web design background” explains what HTML is (p. 164). Anybody with that kind of background will know HTML as the basic markup language for displaying content on the web.

Beyond the technical details of various features, MacDonald also discusses issues to consider when, for example, deciding on categories to which posts or pages can be assigned. Most of the book’s information relates to formatting, automating, and structuring blog posts, but the process is the same for creating websites, and MacDonald addresses differences between blogs and websites when they exist.

The first few chapters expound on why using WordPress is better than coding a website from scratch. While maintenance is easier on the blogging platform, implementing a highly customized design may be simpler using the web markup language. At least that’s my experience—I coded my translation site in HTML and run my writing site using WordPress. While reading the book, I marked several passages for implementation on my writing site. However, there is no need to convince me of the platform’s benefits—I wouldn’t have picked up the book if I didn’t think WordPress was worth a try.

As with many books these days, *WordPress: The Missing Manual* could benefit from more rigorous copy editing, for example, on p. 423: “. . .you’ll look a closer take at. . .” Only once do such mistakes impede understanding: when SEO plug-ins are discussed, but it is unclear whether the two names used (Yoast SEO and WordPress SEO, p. 378 ff.) refer to two different mini-programs or are two names for the same one.

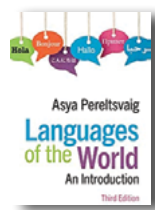
If you want to create your own blog or website, this guide will take you through the process and offer helpful tips along the way. If you want to update an existing site, the detailed table of contents will help you pick just the sections you need.

### Barbara Jungwirth

Barbara Jungwirth writes about medical topics ([www.bjungwirth.com](http://www.bjungwirth.com)) and translates medical and technical documents from German into English ([www.reliable-translations.com](http://www.reliable-translations.com)). She has written for print and online media since her high school days and majored in media studies. You can find her on Twitter at @bjungwirthNY.

### Languages of the World: An Introduction, 3rd ed.

Asya Pereltsvaig. 2021. Cambridge University Press. [ISBN 978-1-108-74812-4. 482 pages, including index. US\$39.95 (softcover).]



Asya Pereltsvaig's third edition of *Languages of the World: An Introduction* succeeds admirably in structuring a curriculum for beginning linguistic students while also serving as a reference work, a guide to further research, and a book to dip into for fascinating language

insights. Chapters are organized by geography and language family and move from interesting anecdotes about language to formal analysis of phonology, morphology, syntax, and grammar. The inherently technical subject is enhanced by Pereltsvaig's enthusiastic yet professional tone and clarified by her numerous tables, charts, sidebars, study questions, and web research topics.

The book's approach is to explore the underlying unity of the hugely diverse world languages through a process of "comparative reconstruction" that infers a common ancestral language family (pp. 14–15). Languages are defined by their relative position on the "dialect continuum" (p. 9). Dialects close together on the continuum are mutually intelligible, like American and British English, and constitute a language. Dialects far apart, like Cantonese and Mandarin, are mutually unintelligible, and therefore different languages, despite sharing a common ideographic writing system (pp. 249, 252). By comparing cognates, sound correspondences, and grammar, linguists can reconstruct a common ancestral language, such as Indo-European, for

languages as different as English, Hindi, and Czech. Cantonese and Mandarin, despite their mutual unintelligibility, belong to the Sino-Tibetan family, yet are unrelated to another contiguous family, Austro-Asiatic, or to Korean and Japanese, two isolates that comprise their own unique language families.

The question then arises: Is there an underlying unity between language families and isolates that posits an innate linguistic ability in humans? The question led to the development of Greenberg's Universals and the Parametric Theory of Language, which postulate underlying structural rules, or grammars—for instance, the relationship between Subjects (S), Verbs (V), and Objects (O)—that persist across the most diverse languages. Greenberg showed that languages requiring the verb-object (VO) order are almost always prepositional, whereas object-verb (OV) languages are almost always postpositional, regardless of language family: Spanish (Indo-European) and Arabic (Semitic) use VO, Japanese (isolate), and Chechen (Northeast Caucasian), OV.

A related rule is the Headedness Parameter. The Head "determines the meaning and properties of the whole phrase" and is accompanied by the Complement, which completes the meaning of the phrase (pp. 445, 444). This parameter is binary: The Head may precede or follow the Complement but must do one or the other. If the Head comes first, the sequence is OV. If the Head comes last, the sequence is VO. Languages, though "different," are therefore also fundamentally "commensurable" (p. 102). If they weren't, translation would be impossible.

Using such rules and the sound inventory available to humans, linguists can construct languages like Klingon or Dothraki never heard before and without native speakers, yet commensurate with all other natural languages. Given Pereltsvaig's thorough, intriguing account, perhaps *homo sapiens* should be renamed *homo loquens*, with language the distinguishing human characteristic.

### Donald R. Riccomini

Donald R. Riccomini is an STC member and Emeritus Senior Lecturer in English at Santa Clara University, where he specialized in engineering and technical communications. He previously spent twenty-three years in high technology as a technical writer, engineer, manager, and director in semiconductors, instrumentation, and server development.



## Drawing Investigations: Graphic Relationships with Science, Culture, and Environment

Sarah Casey and Gerry Davies. 2020. Bloomsbury Visual Arts. [ISBN 978-1-78831-026-0. 236 pages, including index. US\$115.00 (hardcover).]



In an age where technology is touted as the most powerful investigative tool available to researchers, Sarah Casey and Gerry Davies argue for the age-old practice of drawing as an equally powerful investigative tool. Their book, one part of the *Drawing In* series, discusses drawing as an investigative and communication medium in areas of study outside the visual arts. Some of these areas include medical science, theoretical math, environment, history, culture, and conflict.

Each chapter covers a unique field of study and explores different ways drawing has been used by people from varying professional backgrounds and investigative motivations to expand their knowledge in that field. The authors choose an eclectic mix of accounts. Third-person narratives about artists from the past are paired with interview transcripts of current artists; the latter provide a more intimate understanding of the thought process behind the artists' investigative drawings. For example, the story of a researcher studying the fluid dynamics of heart formation by capturing the movement of dye in water is juxtaposed next to the account of a woman trying to understand the nature of her degenerative disease by drawing the disfigurement of bones it causes.

To technical communicators that use and write about evolving technology, an argument for drawing might seem archaic. However, the authors present arguments for using drawing in any investigative work, which are applicable to the field of technical communication as well. For example, technical communicators need to understand a process before they can effectively write about it. The stages preceding the development of a technical document are highly investigative and extrospective, just like the process of drawing. So, as the authors point out, even though digital photography offers a high degree of objectivity and accuracy of details about a subject, its speed of production can be a disadvantage to a researcher. While drawing, the artist spends hours near his or her subject, noticing the most elusive of details and obtaining a deeper knowledge of the subject and its mechanics.

This in-depth knowledge is the holy grail we seek as technical communicators to do our work.

In *Drawing Investigations: Graphic Relationships with Science, Culture and Environment*, Casey and Davies include numerous examples of investigative artists coupled with interesting discussions about how these artists have selected drawing techniques and tools to meet their research needs. However, I would have preferred to have had more pictures in the book to help in understanding the content better. I would suggest that readers keep a computer or cellphone handy while reading so that they can look up and enjoy more of the mentioned drawings. Otherwise, this enjoyable, thought-provoking book is a must-read for all, especially technical communicators who are looking for new avenues of learning.

### Arsela Haque

Arsela Haque is an STC student member, is a science reporter, and is currently enrolled in the technical communication program at the University of Alabama in Huntsville. She holds a master's in Chemistry and enjoyed writing blog posts for her undergraduate P-Chem class.

## In the Know: Debunking 35 Myths About Human Intelligence

Russell T. Warne. 2020. Cambridge University Press. [ISBN 978-1-108-71781-6. 418 pages, including index. US\$25.99 (softcover).]



Psychologist Russell T. Warne believes that intelligence is one of the most important human traits. Intelligence research has been conducted for more than 100 years, yet there is a big gap between what the public believes about human intelligence and the facts that

research has uncovered. Warne has written *In the Know: Debunking 35 Myths about Human Intelligence* as a "guide to correct common false beliefs" (p. xvii) because understanding the truth about human intelligence can help people realize its impact in their lives. His target audience is the non-expert in human intelligence, that is, "students, non-psychologists, K-12 teachers, interested laymen, and scientists from outside the field" (p. xv). He hopes this scholarly knowledge will trickle down from these readers to the public, including the media.



The introduction to *In the Know* provides a content overview as well as a history of intelligence research. The 35 chapters are divided into sections; section titles reveal hints of the important impacts of intelligence on people's lives: The Nature of Intelligence; Measuring Intelligence; Influences on Intelligence; Intelligence and Education; Life Consequences of Intelligence; Demographic Group Differences; and Societal and Ethical Issues. Once readers have digested the introduction, they can choose chapters that interest them, each of which can stand alone, although some may refer to previous chapters.

Warne confronts each of the 35 myths chapter by chapter, starting by citing experts who have been sources of false beliefs. He refutes each, not just with his own opinion and research, but with "opinions that are widely held among intelligence researchers" (p. xvi) while giving examples of false beliefs that permeate daily life. For example, a standard psychology textbook may teach that "Measuring Intelligence Is Difficult (Myth #7)." T-shirts and tote bags proclaim that "Every Child is Gifted (Myth #18)." Jury members with average IQ may not understand that a person with a low IQ may falsely confess to a crime ("Everyone Is About as Smart as I Am – Myth #35"). Despite the amount of research that has been and is being done, "erroneous beliefs about intelligence are widespread" (p. 336). They have repercussions in hiring practices, government policies, and school admissions, among other crucial elements of everyday life. They have become ingrained in the public mind and "inhibit scientific and social progress" (p. 2).

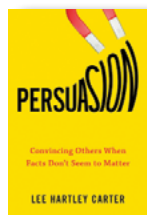
Warne has written a readable book on a technical subject. His point of view is backed up by citations of studies throughout *In the Know* as well as being further explained by figures and tables. His claim to be as non-technical as possible comes with the caveat that research involves statistics. Rather than leave the statistical novice in the dark, Warne includes a statistics "crash course" in the introduction. However, crash course notwithstanding, many readers may find themselves at a disadvantage because much of *In the Know* does rely on this knowledge.

### Linda Davis

Linda M. Davis is an independent communications practitioner in the Los Angeles area. She holds an MA in Communication Management and has specialized in strategic communication planning, publication management, writing, and editing for more than 25 years.

### Persuasion: Convincing Others When Facts Don't Seem to Matter

Lee Hartley Carter. 2019. TarcherPerigee. [ISBN 978-0-14-313347-6. 270 pages. US\$16.00 (hardcover).]



In *Persuasion: Convincing Others When Facts Don't Seem to Matter*, author Lee Hartley Carter pulls back the curtain on the inner workings of communication strategies being implemented by some of the world's biggest brands. Carter is a language strategist and president of

maslansky + partners, a communications consulting group. She argues that effective persuasive rhetoric can deliver lasting change to opinions and behaviors when guided by her company's philosophy, "It's not what you say, it's what they hear" (p. 187).

The introduction addresses the eye-catching subtitle concerning the role of facts in persuasion. Carter bluntly states that, according to psychological research, facts never have been the rhetorical tool we imagined. She cites a recent article in *Social Psychological and Personality Science* which argues that humans are not natural fact-seekers. Instead, we tend to categorize opinions that we agree with as facts due to confirmation bias and reject challenging factual information. Carter bases her strategic approach to persuasion on this framework.

*Persuasion* is divided into five parts which present a method of designing and implementing persuasive rhetoric. Throughout the book, Carter emphasizes how you can apply her strategy to your personal and professional situations. Part 1: You focuses on a persuader's initial actions and encourages practitioners to begin by articulating a specific, bold, yet attainable goal. Carter contends that "Persuasion is about finding an authentic story that will change beliefs or behaviors" (p. 37).

Part 2, Them, is about the other side of the persuasion equation, the target audience. Carter highlights the necessity of genuinely hearing and empathizing with listeners by applying an "active empathy" approach (p. 63). This approach includes seeking out the opinions of naysayers or those who have no strong opinions about our vision. Persuasion based on "fostering connectivity" is more likely to produce positive change in viewpoints (p. 86).

Part 3, Connection, outlines the basic features of an effective persuasion plan. Carter advises persuaders to use feedback from their audience to construct

three central tenets of their persuasive message. These components form a master narrative, which is the language that becomes the “singularly focused message that defines and differentiates you” (p. 110). In Part 4, Story, Carter advises that the strongest narratives are conveyed through visual language and stories. Since “memorability is one of the keys to persuasion,” anecdotes, images, and symbolic gestures are critical features of effective persuasion (p. 170). Part 5, Ownership, urges persuaders to test their persuasion plan and adjust it based on unbiased feedback.

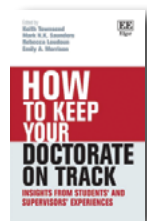
At first glance *Persuasion* appears to be written for corporate marketing strategists. Carter shares success stories and cautionary tales from industry to illustrate her points. However, her formulaic approach to constructing a persuasion plan is generalizable to nearly any situation. Carter’s broader points about relying on empathy and listening as the basis for building a persuasive strategy are also universally applicable in persuasive writing.

### Rachel Wyatt

Rachel Wyatt is working towards her graduate certificate in technical communication from the University of Alabama in Huntsville. She writes and edits curriculum and assessments for Southwestern Advantage.

### How to Keep Your Doctorate on Track: Insights from Students’ and Supervisors’ Experiences

Keith Townsend, Mark N.K. Saunders, Rebecca Loudoun, and Emily A. Morrison, eds. 2020. Edward Elgar Publishing. [ISBN 978-1-80037-530-7. 448 pages, including index. US\$55.00 (softcover).]



Navigating doctoral work is challenging in many ways. Given that struggles are commonplace, anyone pursuing graduate work should have plenty of support and at least one practical guide, like *How to Keep Your Doctorate On Track*.

Editors from three nations collected chapters and vignettes from 59 contributors spanning the globe. Each author (from current doctoral students to recent graduates to current supervisors) writes practical advice on managing doctoral work, regardless of which university in which country on which continent the student works. The text sometimes reads like an instructional guide, providing advice or warnings, and sometimes like a conversational seminar where each

student tells their story of a problem and solution to graduate work. The book has been well edited so that the text is pleasantly readable throughout, whether the subject is managing stress or the light-hearted chapter of letters to a data collection advice column.

Organized into three parts, the topics range from logistics (determining a research topic, receiving feedback, analyzing qualitative data, and getting Institutional Review Board (IRB) approval) to interpersonal skills (managing time, dealing with stress, handling or changing supervisors, combating impostor syndrome). Longer chapters contain research and references, while most vignettes capture personal narratives. The book is meant to be sampled, read out of order, and dipped into throughout the doctoral process—whether for a PhD, EdD, DBA, or another doctorate.

While the contributing authors of *How to Keep Your Doctorate On Track* work mostly in the fields of business or the social sciences, they did an excellent job of writing about experiences that apply broadly. Engineering students won’t find information on data analysis and visualization, for example, but they will find topics on thinking about research and designing quantitative research.

Perhaps the biggest hurdle for most doctoral students is writing, from proposals to journal articles to the dissertation, so it’s no surprise this book gives so much attention to writing: process, planning, revision, reviewing, and publishing. There’s a chapter on the literature review. And for the second largest hurdle, there’s a chapter on the oral defense.

While the primary audience is obviously those considering or undertaking doctoral work, one key secondary audience is supervisors themselves. Each section pairs the perspectives of supervisors/professors with those of students. As the editors themselves point out, the student perspectives can be eye-opening. Perhaps if more supervisors paused to reflect on the varied experiences presented in this text, they could help mitigate some of the anxiety and depression felt by students under their tutelage.

The eBook version is priced from UK£22/US\$31 from Google Play, ebooks.com, and other eBook vendors, while in print, the book can be ordered from the Edward Elgar Publishing website.

### Kelly A. Harrison

Kelly A. Harrison, MFA, teaches technical communication at Stanford University. Formerly, she taught a range of writing courses at San José State University and wrote for various high-tech companies. Kelly is the Associate Editor for *West Trade Review*.

### WordPress for Dummies. 9th ed.,

Lisa Sabin-Wilson. 2021. John Wiley & Sons, Inc. [ISBN 978-1-119-69697-1. 462 pages, including index. US\$29.99 (softcover).]



When I first heard the buzz that WordPress was becoming widely used for more than just blogging software, I ignored it. Digital immigrants like me have witnessed the rise and fall of several different content management systems (CMSs), from FrontPage to Dreamweaver. Why bother learning a new CMS when everyone knows the gold standard is still code? After all, in a few years even the newest program will become obsolete. Right? Wrong! Fortunately for those who would rather focus more on content than code, WordPress has proven to have extraordinary staying power, powering 35% of the web pages online today (p.1). *WordPress for Dummies*, 9<sup>th</sup> ed., by Lisa Sabin-Wilson is an entertaining, easily digestible way to learn how to use this program.

This edition focuses on the more robust WordPress self-hosting software available for download on Wordpress.org rather than the hosted version available on WordPress.com. The self-hosted software offers many features that are not available on the more familiar WordPress.com site, such as access to the core code and free access to templates and plug-ins (p. 13). This software is the preferred choice for professional websites, and according to Sabin-Wilson is the software underpinning sites such as the BBC America website and the Boise State University website (p. 14).

Like all the books in the “For Dummies” series, *WordPress for Dummies* is easy to navigate and beautifully designed. Sabin-Wilson’s book contains helpful icons to draw the reader’s attention to important information, callouts containing instructions and troubleshooting information, and references to helpful sites, and examples that illustrate the process of installing and using the WordPress software. The text is comprehensive and contains all the information a reader would need to know to set up a website, including

choosing a hosting site, applying and tweaking a WordPress theme, and installing plug-ins for their site.

This text does have some minor drawbacks. At times it reads more like a sales tool for WordPress than an objective guide to the program. You won’t find information about bugs common to the WordPress software here or in-depth comparisons to any other similar software programs. Similarly, *WordPress for Dummies* does not contain any information about making effective design choices for your site when perusing the thousands of templates available, nor does it explain what you can do with the code behind the scenes. Readers new to web design will need to purchase supplemental materials on effective design and writing for the web.

I would recommend *WordPress for Dummies* for readers who have made the decision to use WordPress to design their professional website or blog, especially those looking to move beyond the simple hosted programs available at WordPress.com or other similar websites.

### Nicole St. Germaine

Nicole St. Germaine is a Professor in the Technical and Business Writing Program at Angelo State University, as well as a freelance writer and consultant. Her research interests include technical communication for a Mexican-American audience and technical communication in the health fields.

### Bookishness: Loving Books in a Digital Age

Jessica Pressman. 2020. Columbia University Press. [ISBN 978-0-231-19513-3. 196 pages, including index. US\$30.00 (softcover).]



In *Bookishness: Loving Books in a Digital Age*, Jessica Pressman situates the love of books as physical objects in the context of the digital world that threatens to render physical books obsolete. Pressman describes “bookishness” as follows:

“creative acts that engage the physicality of the book within a digital culture, in modes that may be sentimental, fetishistic, radical” (p. 1). These modes manifest in myriad ways, from “kitschy” leggings with the words of *Pride and Prejudice* printed on them and books being cut up and shaped to create new visual art to literary and popular works of fiction that examine the physical book as an important artifact in our digitally mediated world. Overall, Pressman skillfully illuminates a

contemporary phenomenon so ingrained into our cultural relationship with the physical book that its presence will likely seem unmistakable after reading the text. While the book uses some technical language from literary studies, *Bookishness* will likely be accessible to technical communicators interested in this topic.

The book is comprised of six main chapters with additional “Introduction” and “Coda” sections that help contextualize and cohere the overarching arguments present in the text. Chapter 1: How and Now Bookishness “situates bookishness historically” and explains how the anxieties surrounding the death of the book at the turn of the 20<sup>th</sup> century helped to create bookishness (p. 21). Chapter 2: Shelter discusses contemporary fiction that shares the idea that books provide a haven from some of the horrors that have accompanied the advent of the digital world, such as 9/11. Chapter 3: Thing examines diverging narrative works that show “the book as a thing, a poignant artifact and fetish object for the digital age” (p. 22). Chapter 4: Fake elaborates on how the idea of “fakery” (such as the presentation of books on shelves in digital spaces) is essential to digital culture and how this fakery extends to bookish culture. Chapter 5: Weapon and Chapter 6: Memorial provide close readings of contemporary works of fiction that show, respectively, how the “materiality” of the book has been used to attack “monstrous” digital forms and how bookishness works to memorialize not only past people and books but our passing, contemporary bookish moment.

*Bookishness* will likely be of interest to technical communicators interested in literature and books broadly, and those concerned with how physical and digital mediums interact in our contemporary world.

### Dylan Schrader

Dylan Schrader is a proposal developer at the University of Alabama in Huntsville, where he also earned an MA in Professional Communication.

### Creating Effective Visualizations for Technical Communication <Images, Videos, Interactive Content>

Marc Achteleg. 2020. indoition publishing e.K. [ISBN 978-3-943860-10-8. 340 pages. US\$49.00 (softcover).]



The long-awaited fourth book in Marc Achteleg's *Technical Documentation Best Practices* series was finally published at the end of 2020. The first three books in the series on planning and structuring, designing, and writing have been around for a long time, being my favorite go-to references in my daily work. *Creating Effective Visualizations for Technical Communication* now completes the series.

When the new book in the series became available, I had to get it as I was looking for advice on a specific question: In a team where we must handle an incredibly high number of screenshots, we often discussed the idea of getting rid of figure captions, without reaching a decision. While many industry guidelines talk about style, tone, capitalization, and other details, few recommendations exist about handling screenshots in software documentation. Would I find an answer to our question in the new book?

Like the other books of the *Technical Documentation Best Practices* series, Achteleg's book is full of practical advice and numerous examples. “The book provides clear rules and unambiguous recommendations. No boring theory, no musings, no shoptalk.” (p. 9) You don't have to read the book from start to finish, but you can go to any chapter you wish because all topics are independent of each other. Teaching the principles of effective visualization, the book covers general recommendations for visuals like “Common basics of visualization” and “Images in general.”

You find information about images of hardware and software (including chapters such as “Get rid of dead space”), including chapters on video design and production as well as on interactive content. One of the chapters gave me the information I needed: “You rarely need figure titles” supported our decision to let go of figure captions for graphics in our technical documentation.

Achteleg is a technical documentation expert based in Europe, offering consultancy in software user assistance with his company, *indoition*. All books in the series are also available in German, giving examples and



terminology for writers working in German. He offers all four books of the *Best Practice* series in a bundle, sold as the *Technical Writer's Companion* as an electronic guide and reference for technical writers.

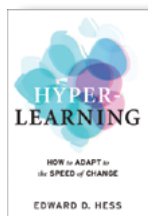
I love the *Technical Documentation Best Practices* series because of its no-nonsense tone, practical tips, and real-life examples. For a technical writer working in software documentation, *Creating Effective Visualizations for Technical Communication* is such a valuable reference in a time where visuals like screenshots, diagrams, and videos play an ever-increasing role.

### Karina Lehrner-Mayer

Karina Lehrner-Mayer is a Senior STC member, holds a degree in translation, and has 20 years' experience in Technical Communication. She works as a Documentation Specialist at the Austrian-based headquarters of ISIS Papyrus Europe AG, an international company offering solutions for inbound and outbound business communication and process management.

### Hyper-Learning: How to Adapt to the Speed of Change

Edward D. Hess. 2020. Berrett-Koehler Publishers, Inc. [ISBN 978-1-5230-8924-6. 320 pages, including index. US\$29.95 (hardcover).]



"Hyper-Learning is continual learning, unlearning, and relearning" (p. 1). It is "learning that is *over* and *above* what is typical" (p. 2). While many of us might take "hyper" to mean overly excited or unusually energetic, the theme in *Hyper-Learning: How to Adapt to the Speed of*

*Change* is finding inner peace through a quiet ego, a quiet mind, a quiet body, and a positive emotional state.

Edward Hess defines inner peace as quietness and stillness that enables you to be fully present "with an open and non-judgmental mind and lack of self-absorption. It's a state of positivity with limited stress and fear" (p. 23). For example, if you are in a room full of people sharing ideas, inner peace will help you to recognize and embrace new opportunities, manage your emotions when things get intense, and engage your brain, mind, and body for Hyper-Learning.

In Chapter 2, you will learn how to adopt a Hyper-Learning mindset, which may challenge deeply ingrained attitudes you have about how you learn, manage your

thoughts and emotions, and relate to others. While reading, you will have opportunities to reflect on various topics and take diagnostic tests to assess your current mindset and where you stand on this growth journey.

By Chapter 10, you will be asking yourself if you can adapt and evolve to stay relevant and flourish in the digital age and if your Hyper-Learning mindset will help you add value to society in ways that technology can't. If you want to answer in the affirmative, read *Hyper-Learning* (and re-read as necessary) and take the time to reflect on the questions and situations presented throughout the book.

For inspiration, there are two "personal transformation" stories in Chapters 4 and 5 that tell how each person pursued a new way of being and a new way of working on their way to a Hyper-Learning mindset. They share the approaches they took, attitudes they had to work on, and their "why, what, and how." For example, one person uses centering and meditation to quell unproductive mental chatter and has since learned that her staff members appreciate centering breaks when meetings get heated. The other had a pivotal moment when he realized only like-minded people were in his social circle. Once he sought out people who were different than him, he discovered a new fullness in life.

How will you get comfortable with the new, the different, and the unknown? "A mindset that is comfortable with impermanence enables you to be curious about the answers" (p. 261). Curious people will thrive in the age of digital advances. Let this book get you started on the path to learning and growing in your personal life and in your work life while developing a Hyper-Learning mindset.

### Michelle Gardner

Michelle Gardner, CPTC, is the marketing content writer for a life sciences company and the editor-in-chief for the Mi MoJo Methods Web site. She has a bachelor's degree in Journalism: Public Relations from California State University, Long Beach, and a master's degree in Computer Resources and Information Management from Webster University.



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STC Summit Pre-Conference Courses (half day)	3
STC Annual Summit	8
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